ETSI TS 125 221 V10.1.0 (2011-10)



Universal Mobile Telecommunications System (UMTS); Physical channels and mapping of transport channels onto physical channels (TDD) (3GPP TS 25.221 version 10.1.0 Release 10)



Reference RTS/TSGR-0125221vA10 Keywords UMTS

ETSI

650 Route des Lucioles F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C Association à but non lucratif enregistrée à la Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
 - 1 presented to TSG for information;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document describes the characteristics of the physicals channels and the mapping of the transport channels to physical channels in the TDD mode of UTRA.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1]	3GPP TS 25.201: "Physical layer - general description".
[2]	3GPP TS 25.211: "Physical channels and mapping of transport channels onto physical channels (FDD)".
[3]	3GPP TS 25.212: "Multiplexing and channel coding (FDD)".
[4]	3GPP TS 25.213: "Spreading and modulation (FDD)".
[5]	3GPP TS 25.214: "Physical layer procedures (FDD)".
[6]	3GPP TS 25.215: "Physical layer – Measurements (FDD)".
[7]	3GPP TS 25.222: "Multiplexing and channel coding (TDD)".
[8]	3GPP TS 25.223: "Spreading and modulation (TDD)".
[9]	3GPP TS 25.224: "Physical layer procedures (TDD)".
[10]	3GPP TS 25.225: "Physical layer – Measurements (TDD)".
[11]	3GPP TS 25.301: "Radio Interface Protocol Architecture".
[12]	3GPP TS 25.302: "Services Provided by the Physical Layer".
[13]	3GPP TS 25.401: "UTRAN Overall Description".
[14]	3GPP TS 25.402: "Synchronisation in UTRAN, Stage 2".
[15]	3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Cell Reselection in Connected Mode".
[16]	3GPP TS 25.427: "UTRAN Iur and Iub interface user plane protocols for DCH data streams".
[17]	3GPP TS 25.435: "UTRAN $I_{\rm ub}$ Interface User Plane Protocols for Common Transport Channel Data Streams".
[18]	3GPP TS25.308: High Speed Downlink Packet Access (HSDPA); Overall description; Stage 2
[19]	3GPP TS25.331: "RRC Protocol Specification ".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

16QAM 16 Quadrature Amplitude Modulation

BCH Broadcast Channel

CCPCH Common Control Physical Channel
CCTrCH Coded Composite Transport Channel
CDMA Code Division Multiple Access
CQI Channel Quality Indicator

DCH Dedicated Channel

DL Downlink

DPCH Dedicated Physical Channel Discontinuous Reception DRX Downlink Shared Channel **DSCH** DTX Discontinuous Transmission **DwPCH** Downlink Pilot Channel **DwPTS** Downlink Pilot Time Slot E-AGCH E-DCH Absolute Grant Channel E-DCH **Enhanced Dedicated Channel**

E-HICH E-DCH Hybrid ARQ Indicator Channel E-PUCH E-DCH Physical Uplink Channel

E-RUCCH E-DCH Random Access Uplink Control Channel

E-UCCH E-DCH Uplink Control Channel FACH Forward Access Channel FDD Frequency Division Duplex FEC Forward Error Correction

GP Guard Period

GSM Global System for Mobile Communication

HARQ Hybrid ARQ

HS-DSCH High Speed Downlink Shared Channel

HS-PDSCH High Speed Physical Downlink Shared Channel

HS-SCCH Shared Control Channel for HS-DSCH HS-SICH Shared Information Channel for HS-DSCH

IMB Integrated Mobile Broadcast

MBSFN MBMS over a Single Frequency Network

MIB Master Information Block MICH MBMS Indicator Channel

MIMO single user Multiple Input Multiple Output

MS burst MBSFN Special burst MT burst MBSFN Traffic burst

MU-MIMO Multi-User Multiple Input Multiple Output

NI MBMS Notification Indicator

NRT Non-Real Time

OVSF Orthogonal Variable Spreading Factor

P-CCPCH Primary CCPCH PCH Paging Channel

PDSCH Physical Downlink Shared Channel

PI Paging Indicator (value calculated by higher layers)

PICH Page Indicator Channel

 $\begin{array}{ll} PLCCH & Physical\ Layer\ Common\ Control\ Channel \\ P_q & Paging\ Indicator\ (indicator\ set\ by\ physical\ layer) \end{array}$

PRACH Physical Random Access Channel
PUSCH Physical Uplink Shared Channel
RACH Random Access Channel

RF Radio Frame RT Real Time

S-CCPCH Secondary CCPCH
SCH Synchronisation Channel
SCTD Space Code Transmit Diversity

SF Spreading Factor

SFN Cell System Frame Number
SS Synchronisation Shift
TCH Traffic Channel
TDD Time Division Duplex
TDMA Time Division Multiple Access

TFC Transport Format Combination

TFCI Transport Format Combination Indicator

TFI Transport Format Indicator
TPC Transmitter Power Control
TrCH Transport Channel

TSTD Time Switched Transmit Diversity
TTI Transmission Time Interval

UE User Equipment

UL Uplink

UMTS Universal Mobil Telecommunications System

UpPTS Uplink Pilot Time Slot UpPCH Uplink Pilot Channel USCH Uplink Shared Channel

UTRAN UMTS Terrestrial Radio Access Network

4 Services offered to higher layers

4.1 Transport channels

Transport channels are the services offered by layer 1 to the higher layers. A transport channel is defined by how and with what characteristics data is transferred over the air interface. A general classification of transport channels is into two groups:

- Dedicated Channels, using inherent addressing of UE
- Common Channels, using explicit addressing of UE if addressing is needed

General concepts about transport channels are described in [12].

4.1.1 Dedicated transport channels

There exists two types of dedicated transport channel, the Dedicated Channel (DCH) and the Enhanced Dedicated Channel (E-DCH).

4.1.1.1 DCH – Dedicated Channel

The Dedicated Channel (DCH) is an up- or downlink transport channel that is used to carry user or control information between the UTRAN and a UE.

4.1.1.2 E-DCH – Enhanced Dedicated Channel

The Enhanced Dedicated Channel (E-DCH) is an uplink transport channel.

For 1.28Mcps TDD multi-carrier E-DCH transmission, a UE in CELL_DCH state shall have only one E-DCH per carrier. There would be one or more E-DCHs to be transmitted from a UE in CELL_DCH state in a TTI.

4.1.2 Common transport channels

There are seven types of common transport channels for 3.84Mcps and 7.68Mcps TDD: BCH, FACH, PCH, RACH, USCH, DSCH, HS-DSCH.

There are eight types of common transport channels for 1.28Mcps TDD: BCH, FACH, PCH, RACH, USCH, DSCH, HS-DSCH, E-DCH.

4.1.2.1 BCH - Broadcast Channel

The Broadcast Channel (BCH) is a downlink transport channel that is used to broadcast system- and cell-specific information.

4.1.2.2 FACH – Forward Access Channel

The Forward Access Channel (FACH) is a downlink transport channel that is used to carry control information to a mobile station when the system knows the location cell of the mobile station. The FACH may also carry short user packets.

4.1.2.3 PCH – Paging Channel

The Paging Channel (PCH) is a downlink transport channel that is used to carry control information to a mobile station when the system does not know the location cell of the mobile station.

4.1.2.4 RACH – Random Access Channel

The Random Access Channel (RACH) is an up link transport channel that is used to carry control information from mobile station. The RACH may also carry short user packets.

4.1.2.5 USCH – Uplink Shared Channel

The uplink shared channel (USCH) is an uplink transport channel shared by several UEs carrying dedicated control or traffic data.

4.1.2.6 DSCH – Downlink Shared Channel

The downlink shared channel (DSCH) is a downlink transport channel shared by several UEs carrying dedicated control or traffic data.

4.1.2.7 HS-DSCH – High Speed Downlink Shared Channel

The High Speed Downlink Shared Channel (HS-DSCH) is a downlink transport channel shared by several UEs. The HS-DSCH is associated with one or several Shared Control Channels (HS-SCCH). The HS-DSCH is transmitted over the entire cell or over only part of the cell using e.g. beam-forming antennas.

For 1.28Mcps TDD, in a multi-frequency HS-DSCH cell, the HS-DSCH may be transmitted to a UE on one or more carriers in CELL_DCH state and on only one carrier in CELL_FACH, CELL_PCH and URA_PCH state in a TTI. The term 'multi-carrier HS-DSCH reception' refers to the HS-DSCH reception on multiple carriers in a TTI for a UE.

4.1.2.8 E-DCH – Enhanced Dedicated Channel

The Enhanced Dedicated Channel (E-DCH) is an uplink transport channel in CELL_FACH and IDLE mode for 1.28Mcps TDD only.

4.2 Indicators

Indicators are means of fast low-level signalling entities which are transmitted without using information blocks sent over transport channels. The meaning of indicators is implicit to the receiver.

The indicator(s) defined in the current version of the specifications are: Paging Indicator (PI) and MBMS Notification Indicator (NI).

5 Physical channels for the 3.84 Mcps option

Sub-clauses 5.1 to 5.7 do not apply to 3.84 Mcps MBSFN IMB. Sub-clause 5.8 describes physical channels for 3.84 Mcps MBSFN IMB.

All physical channels take three-layer structure with respect to timeslots, radio frames and system frame numbering (SFN), see [14]. Depending on the resource allocation, the configuration of radio frames or timeslots becomes different. All physical channels need a guard period in every timeslot. The time slots are used in the sense of a TDMA component to separate different user signals in the time domain. The physical channel signal format is presented in figure 1.

A physical channel in TDD is a burst, which is transmitted in a particular timeslot within allocated Radio Frames. The allocation can be continuous, i.e. the time slot in every frame is allocated to the physical channel or discontinuous, i.e. the time slot in a subset of all frames is allocated only. A burst is the combination of two data parts, a midamble part and a guard period. The duration of a burst is one time slot. Several bursts can be transmitted at the same time from one transmitter. In this case, the data parts must use different OVSF channelisation codes, but the same scrambling code. The midamble parts are either identically or differently shifted versions of a cell-specific basic midamble code, see section 5.2.3. Note when in MBSFN operation, a midamble is not necessarily cell-specific.

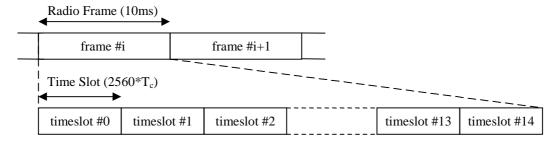


Figure 1: Physical channel signal format

The data part of the burst is spread with a combination of channelisation code and scrambling code. The channelisation code is a OVSF code, that can have a spreading factor of 1, 2, 4, 8, or 16. The data rate of the physical channel is depending on the used spreading factor of the used OVSF code.

The midamble part of the burst can contain two different types of midambles: a short one of length 256 chips, or a long one of 512 chips. The data rate of the physical channel is depending on the used midamble length. Additionally, when in MBSFN operation a midamble of length 320 chips is used.

So a physical channel is defined by frequency, timeslot, channelisation code, burst type and Radio Frame allocation. The scrambling code and the basic midamble code are broadcast and may be constant within a cell. When a physical channel is established, a start frame is given. The physical channels can either be of infinite duration, or a duration for the allocation can be defined.

5.1 Frame structure

The TDMA frame has a duration of 10 ms and is subdivided into 15 time slots (TS) of 2560*T_c duration each. A time slot corresponds to 2560 chips. The physical content of the time slots are the bursts of corresponding length as described in subclause 5.2.2.

Each 10 ms frame consists of 15 time slots, each allocated to either the uplink or the downlink (figure 2). With such a flexibility, the TDD mode can be adapted to different environments and deployment scenarios. In any configuration at least one time slot has to be allocated for the downlink and at least one time slot has to be allocated for the uplink with the exception of no uplink timeslots when the entire carrier is dedicted to MBSFN

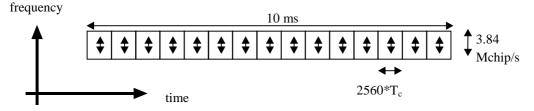
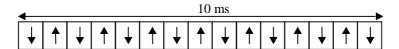
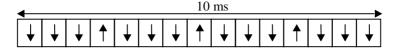


Figure 2: The TDD frame structure

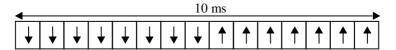
Examples for multiple and single switching point configurations as well as for symmetric and asymmetric UL/DL allocations are given in figure 3.



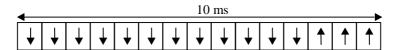
Multiple-switching-point configuration (symmetric DL/UL allocation)



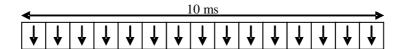
Multiple-switching-point configuration (asymmetric DL/UL allocation)



Single-switching-point configuration (symmetric DL/UL allocation)



Single-switching-point configuration (asymmetric DL/UL allocation)



Entire carrier dedicated to MBSFN

Figure 3: TDD frame structure examples

5.2 Dedicated physical channel (DPCH)

The DCH as described in subclause 4.1.1 is mapped onto the dedicated physical channel.

5.2.1 Spreading

Spreading is applied to the data part of the physical channels and consists of two operations. The first is the channelisation operation, which transforms every data symbol into a number of chips, thus increasing the bandwidth of the signal. The number of chips per data symbol is called the Spreading Factor (SF). The second operation is the scrambling operation, where a scrambling code is applied to the spread signal. Details on channelisation and scrambling operation can be found in [8].

5.2.1.1 Spreading for Downlink Physical Channels

Downlink physical channels shall use SF = 16. Multiple parallel physical channels can be used to support higher data rates. These parallel physical channels shall be transmitted using different channelisation codes, see [8]. These codes with SF = 16 are generated as described in [8].

Operation with a single code with spreading factor 1 is possible for the downlink physical channels.

5.2.1.2 Spreading for Uplink Physical Channels

The range of spreading factor that may be used for uplink physical channels shall range from 16 down to 1. For each physical channel an individual minimum spreading factor SF_{min} is transmitted by means of the higher layers. There are two options that are indicated by UTRAN:

- 1. The UE shall use the spreading factor SF_{min} , independent of the current TFC.
- 2. The UE shall autonomously increase the spreading factor depending on the current TFC.

If the UE autonomously changes the SF, it shall always vary the channelisation code along the branch with the higher code numbering of the allowed OVSF sub tree, as depicted in [8]. In the event that code hopping is configured by higher layers, the allowed OVSF sub-tree is that subtended by the effective allocated OVSF code after the hop sequence has been applied to the allocated OVSF code (see [9]).

For multicode transmission a UE shall use a maximum of two physical channels per timeslot simultaneously. These two parallel physical channels shall be transmitted using different channelisation codes, see [8].

5.2.2 Burst Types

Four types of bursts for dedicated physical channels are defined. All of them consist of two data symbol fields, a midamble and a guard period, the lengths of which are different for the individual burst types. Thus, the number of data symbols in a burst depends on the SF and the burst type, as depicted in table 1.

Burst Type 3 Spreading factor (SF) **Burst Type 2 Burst Type 1 Burst Type 4** 1952 2208 1856 2112 2 976 1104 928 N/A 4 488 552 464 N/A 8 244 276 232 N/A 16 122 138 116 132

Table 1: Number of data symbols (N) for burst types 1, 2, 3 and 4

The support of burst types 1, 2 and 3 is mandatory for UEs supporting transmit and receive functions. UEs supporting transmit and receive functions and also MBSFN operation must additionally support burst type 4. UEs with receive only capability need only support burst type 4. The four different bursts defined here are well suited for different applications, as described in the following sections.

5.2.2.1 Burst Type 1

The burst type 1 can be used for uplink and downlink. Due to its longer midamble field this burst type supports the construction of a larger number of training sequences, see 5.2.3. The maximum number of training sequences depend on the cell configuration, see annex A. For the burst type 1 this number may be 4, 8, or 16.

The data fields of the burst type 1 are 976 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 1 above. The midamble of burst type 1 has a length of 512 chips. The guard period for the burst type 1 is 96 chip periods long. The burst type 1 is shown in Figure 4. The contents of the burst fields are described in table 2.

Table 2: The contents of the burst type 1 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-975	976	Cf table 1	Data symbols
976-1487	512	-	Midamble
1488-2463	976	Cf table 1	Data symbols
2464-2559	96	-	Guard period

Data symbols 976 chips	Midamble 512 chips	Data symbols 976 chips	GP 96 CP
4	2560*T _c		

Figure 4: Burst structure of the burst type 1. GP denotes the guard period and CP the chip periods

5.2.2.2 Burst Type 2

The burst type 2 can be used for uplink and downlink. It offers a longer data field than burst type 1 on the cost of a shorter midamble. Due to the shorter midamble field the burst type 2 supports a maximum number of training sequences of 3 or 6 only, depending on the cell configuration, see annex A.

The data fields of the burst type 2 are 1104 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 1 above. The guard period for the burst type 2 is 96 chip periods long. The burst type 2 is shown in Figure 5. The contents of the burst fields are described in table 3.

Table 3: The contents of the burst type 2 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-1103	1104	cf table 1	Data symbols
1104-1359	256	-	Midamble
1360-2463	1104	cf table 1	Data symbols
2464-2559	96	-	Guard period

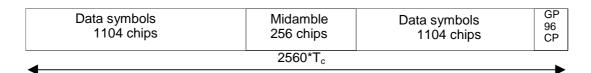


Figure 5: Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods

5.2.2.3 Burst Type 3

The burst type 3 is used for uplink only. Due to the longer guard period it is suitable for initial access or access to a new cell after handover. It offers the same number of training sequences as burst type 1.

The data fields of the burst type 3 have a length of 976 chips and 880 chips, respectively. The corresponding number of symbols depends on the spreading factor, as indicated in table 1 above. The midamble of burst type 3 has a length of 512 chips. The guard period for the burst type 3 is 192 chip periods long. The burst type 3 is shown in Figure 6. The contents of the burst fields are described in table 4.

Table 4: The contents of the burst type 3 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-975	976	Cf table 1	Data symbols
976-1487	512	-	Midamble
1488-2367	880	Cf table 1	Data symbols
2368-2559	192	-	Guard period

Data symbols 976 chips	Midamble 512 chips	Data symbols 880 chips	GP 192 CP
4	2560*T _c		

Figure 6: Burst structure of the burst type 3. GP denotes the guard period and CP the chip periods

5.2.2.3A Burst Type 4

The burst type 4 is used for downlink MBSFN operation only and supports a single training sequence.

The data fields of the burst type 4 are 1056 chips long. The corresponding number of symbols is 132 as indicated in table 1 above. The midamble of burst type 4 has a length of 320 chips. The guard period for the burst type 4 is 128 chip periods long. The burst type 4 is shown in Figure 6A. The contents of the burst fields are described in table 4A.

Table 4A: The contents of the burst type 4 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-1055	1056	Cf table 1	Data symbols
1056-1375	320	-	Midamble
1376-2431	1056	Cf table 1	Data symbols
2432-2559	128	-	Guard period

Data symbols 1056 chips	Midamble 320 chips	Data symbols 1056 chips	GP 128 CP
	2560*T _c		

Figure 6A: Burst structure of the burst type 4. GP denotes the guard period and CP the chip periods

5.2.2.4 Transmission of TFCI

All burst types 1, 2, 3 and 4 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied, except for the MBSFN FACH where the (16,5) biorthogonal code is always used for TFCI when TFCI is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with the lowest physical channel sequence number (p) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

The transmission of TFCI is done in the data parts of the respective physical channel. In DL the TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. In DL, the modulation applied to the TFCI code word bits is the same as that applied to the data symbols. In UL, independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI code word is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 7 shows the position of the TFCI code word in a traffic burst in downlink. Figure 8 shows the position of the TFCI code word in a traffic burst in uplink.

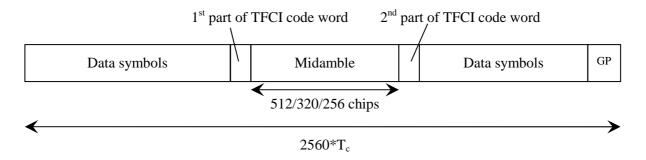


Figure 7: Position of the TFCI code word in the traffic burst in case of downlink

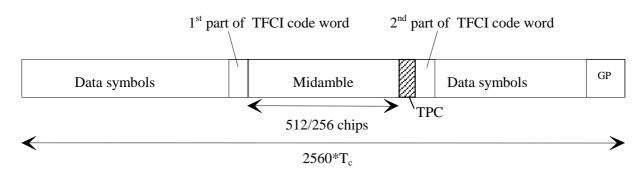


Figure 8: Position of the TFCI code word in the traffic burst in case of uplink

Two examples of TFCI transmission in the case of multiple DPCHs used for a connection are given in the Figure 9 and Figure 10 below. Combinations of the two schemes shown are also applicable.

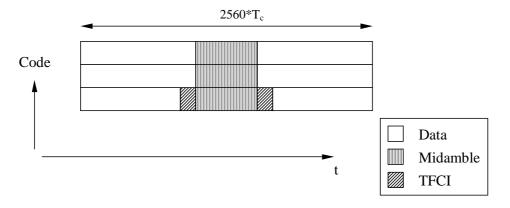


Figure 9: Example of TFCI transmission with physical channels multiplexed in code domain



Figure 10: Example of TFCI transmission with physical channels multiplexed in time domain

In case the Node B receives an invalid TFI combination on the DCHs mapped to one CCTrCH the procedure described in [16] shall be applied. According to this procedure DTX shall be applied to all DPCHs to which the CCTrCH is mapped to.

5.2.2.5 Transmission of TPC

Burst types 1, 2 and 3 for dedicated channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the midamble. Figure 11 shows the position of the TPC in a traffic burst.

For every user the TPC information shall be transmitted at least once per transmitted frame. If a TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as the TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the physical channel corresponding to physical channel sequence number p=1. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

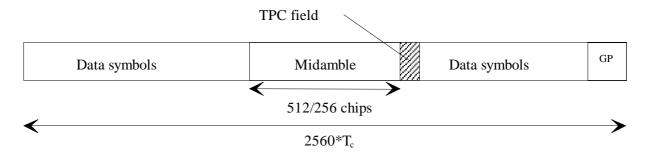


Figure 11: Position of TPC information in the traffic burst

The length of the TPC field is N_{TPC} bits. The TPC field is formed via repetition encoding a single bit b_{TPC} , N_{TPC} times.

The relationship between b_{TPC} and the TPC command is shown in table 4B.

Table 4B: TPC bit pattern

b _{TPC}	TPC command	Meaning
0	'Down'	Decrease Tx Power
1	'Up'	Increase Tx Power

5.2.2.6 Timeslot formats

5.2.2.6.1 Downlink timeslot formats

The downlink timeslot format depends on the spreading factor, midamble length and on the number of the TFCI code word bits, as depicted in the table 5a. For MBSFN operation the timeslot format also depends upon the symbol modulation scheme used. Slot formats 20-27 are only applicable to MBSFN operation with burst type 4.

Table 5a: Time slot formats for the Downlink

Slot Format #	Spreading Factor	Midamble length (chips)	N _{TFCI code} word (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field (bits)
0	16	512	0	244	244	122
1	16	512	4	244	240	120
2	16	512	8	244	236	118
3	16	512	16	244	228	114
4	16	512	32	244	212	106
5	16	256	0	276	276	138
6	16	256	4	276	272	136
7	16	256	8	276	268	134
8	16	256	16	276	260	130
9	16	256	32	276	244	122
10	1	512	0	3904	3904	1952
11	1	512	4	3904	3900	1950
12	1	512	8	3904	3896	1948
13	1	512	16	3904	3888	1944
14	1	512	32	3904	3872	1936
15	1	256	0	4416	4416	2208
16	1	256	4	4416	4412	2206
17	1	256	8	4416	4408	2204
18	1	256	16	4416	4400	2200
19	1	256	32	4416	4384	2192
20 (QPSK)	16	320	0	264	264	132
21 (QPSK)	16	320	16	264	248	124
22 (16QAM)	16	320	0	528	528	264
23 (16QAM)	16	320	16	528	512	256
24 (QPSK)	1	320	0	4224	4224	2112
25 (QPSK)	1	320	16	4224	4208	2104
26 (16QAM)	1	320	0	8448	8448	4224
27 (16QAM)	1	320	16	8448	8432	4216

5.2.2.6.2 Uplink timeslot formats

The uplink timeslot format depends on the spreading factor, midamble length, guard period length and on the number of the TFCI code word bits. Due to TPC, different amount of bits are mapped to the two data fields. The timeslot formats are depicted in the table 5b. Note that slot format #90 shall only be used for HS_SICH.

Table 5b: Timeslot formats for the Uplink

Slot Format	Spreadin g Factor	Midambl e length	Guard Period	N _{TFCI}	N _{TPC} (bits)	Bits/sl ot	N _{Data/Slo} t (bits)	N _{data/data} field(1) (bits)	N _{data/data}
#	16	(chips) 512	(chips) 96	(bits)	0	244	244	122	(bits) 122
0	16	512	96	0	2	244	242	122	120
2	16	512	96	4	2	244	238	120	118
	16	512	96	8	2	244	234	118	116
3	16	512	96	16	2	244	234	114	112
5	16	512	96	32	2	244	210	106	104
					0			138	138
6 7	16 16	256 256	96 96	0	2	276 276	276 274	138	136
8	16	256	96	4	2	276	270	136	134
9	16	256	96	8	2	276	266	134	132
10	16	256	96	16	2	276	258	130	128
11	16	256	96	32	2	276	242	122	120
						1			
12	8	512	96	0	0	488	488	244	244
13	8	512	96	0	2	486	484	244	240
14	8	512	96	4	2	482	476	240	236
15	8	512	96	8	2	478	468	236	232
16	8	512	96	16	2	470	452	228	224
17	8	512	96	32	2	454	420	212	208
18	8	256	96	0	0	552	552	276	276
19	8	256	96	0	2	550	548	276	272
20	8	256	96	4	2	546	540	272	268
21	8	256	96	8	2	542	532	268	264
22	8	256	96	16	2	534	516	260	256
23	8	256	96	32	2	518	484	244	240
24	4	512	96	0	0	976	976	488	488
25	4	512	96	0	2	970	968	488	480
26	4	512	96	4	2	958	952	480	472
27	4	512	96	8	2	946	936	472	464
28	4	512	96	16	2	922	904	456	448
29	4	512	96	32	2	874	840	424	416
30	4	256	96	0	0	1104	1104	552	552
31	4	256	96	0	2	1098	1096	552	544
32	4	256	96	4	2	1086	1080	544	536
33	4	256	96	8	2	1074	1064	536	528
34	4	256	96	16	2	1050	1032	520	512
35	4	256	96	32	2	1002	968	488	480
36	2	512	96	0	0	1952	1952	976	976
37	2	512	96	0	2	1938	1936	976	960
38	2	512	96	4	2	1910	1904	960	944
39	2	512	96	8	2	1882	1872	944	928
40	2	512	96	16	2	1826	1808	912	896
41	2	512	96	32	2	1714	1680	848	832
42	2	256	96	0	0	2208	2208	1104	1104
43	2	256	96	0	2	2194	2192	1104	1088
44	2	256	96	4	2	2166	2160	1088	1072
45	2	256	96	8	2	2138	2128	1072	1056
46	2	256	96	16	2	2082	2064	1040	1024
47	2	256	96	32	2	1970	1936	976	960

Slot Format #	Spreadin g Factor	Midambl e length (chips)	Guard Period (chips)	N _{TFCI} code word (bits)	N _{TPC} (bits)	Bits/sI ot	N _{Data/Slo} t (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
48	1	512	96	0	0	3904	3904	1952	1952
49	1	512	96	0	2	3874	3872	1952	1920
50	1	512	96	4	2	3814	3808	1920	1888
51	1	512	96	8	2	3754	3744	1888	1856
52	1	512	96	16	2	3634	3616	1824	1792
53	1	512	96	32	2	3394	3360	1696	1664
54	1	256	96	0	0	4416	4416	2208	2208
55	1	256	96	0	2	4386	4384	2208	2176
56	1	256	96	4	2	4326	4320	2176	2144
57	1	256	96	8	2	4266	4256	2144	2112
58	1	256	96	16	2	4146	4128	2080	2048
59	1	256	96	32	2	3906	3872	1952	1920
60	16	512	192	0	0	232	232	122	110
61	16	512	192	0	2	232	230	122	108
62	16	512	192	4	2	232	226	120	106
63	16	512	192	8	2	232	222	118	104
64	16	512	192	16	2	232	214	114	100
65	16	512	192	32	2	232	198	106	92
66	8	512	192	0	0	464	464	244	220
67	8	512	192	0	2	462	460	244	216
68	8	512	192	4	2	458	452	240	212
69	8	512	192	8	2	454	444	236	208
70	8	512	192	16	2	446	428	228	200
71	8	512	192	32	2	430	396	212	184
72	4	512	192	0	0	928	928	488	440
73	4	512	192	0	2	922	920	488	432
74	4	512	192	4	2	910	904	480	424
75	4	512	192	8	2	898	888	472	416
76	4	512	192	16	2	874	856	456	400
77	4	512	192	32	2	826	792	424	368
78	2	512	192	0	0	1856	1856	976	880
79	2	512	192	0	2	1842	1840	976	864
80	2	512	192	4	2	1814	1808	960	848
81	2	512	192	8	2	1786	1776	944	832
82	2	512	192	16	2	1730	1712	912	800
83	2	512	192	32	2	1618	1584	848	736
84	1	512	192	0	0	3712	3712	1952	1760
85	1	512	192	0	2	3682	3680	1952	1728
86	1	512	192	4	2	3622	3616	1920	1696
87	1	512	192	8	2	3562	3552	1888	1664
88	1	512	192	16	2	3442	3424	1824	1600
89	1	512	192	32	2	3202	3168	1696	1472
90	16	512	96	0	8	244	236	122	114

5.2.3 Training sequences for spread bursts

In this subclause, the training sequences for usage as midambles in burst type 1, 2,3 and 4 (see subclause 5.2.2) are defined. The training sequences, i.e. midambles, of different users active in the same cell and same time slot are

cyclically shifted versions of one cell-specific single basic midamble code. In the case of MBSFN timeslots there is only a single midamble and this is derived from a single basic midamble code which is not necessarily cell-specific. The applicable basic midamble codes are given in Annex A.1 and A.2. As different basic midamble codes are required for different burst formats, the Annex A.1 shows the basic midamble codes \mathbf{m}_{PL} for burst type 1 and 3, and Annex A.2 shows \mathbf{m}_{PS} for burst types 2 and 4. It should be noted that burst type 2 must not be mixed with burst type 1 or 3 in the same timeslot of one cell and furthermore burst type 4 shall not be mixed with any other burst type in the same timeslot of one cell.

The basic midamble codes in Annex A.1 and A.2 are listed in hexadecimal notation. The binary form of the basic midamble code shall be derived according to table 6 below.

4 binary elements	Mannad on bayada simal digit
m_{i}	Mapped on hexadecimal digit
-1 -1 -1 -1	0
-1 -1 -1 1	1
-1 -1 1 –1	2
-1 -1 1 1	3
-1 1-1-1	4
-1 1-1 1	5
-1 1 1 –1	6
-1 1 1 1	7
1 -1 -1 –1	8
1 -1 -1 1	9
1 -1 1 -1	Α
1 -1 1 1	В
1 1-1-1	С
1 1-1 1	D
1 1 1 –1	E
1 1 1 1	F

Table 6: Mapping of 4 binary elements m_i on a single hexadecimal digit

For each particular basic midamble code, its binary representation can be written as a vector \mathbf{m}_{P} :

$$\mathbf{m}_{\mathbf{p}} = \left(m_1, m_2, \dots, m_p \right) \tag{1}$$

According to Annex A.1, the size of this vector \mathbf{m}_P is P=456 for burst types 1 and 3. Annex A.2 is setting P=192 for burst types 2 and 4. As QPSK modulation is used, the training sequences are transformed into a complex form, denoted as the complex vector \mathbf{m}_P :

$$\underline{\mathbf{m}}_{P} = \left(\underline{m}_{1}, \underline{m}_{2}, \dots, \underline{m}_{P}\right) \tag{2}$$

The elements \underline{m}_i of $\underline{\mathbf{m}}_P$ are derived from elements m_i of \mathbf{m}_P using equation (3):

$$\underline{m}_i = (\mathbf{j})^i \cdot m_i \text{ for all } i = 1, ..., P$$
(3)

Hence, the elements m_i of the complex basic midamble code are alternating real and imaginary.

To derive the required training sequences (different shifts), this vector \mathbf{m}_{p} is periodically extended to the size:

$$i_{\max} = L_m + (K'-1)W + \lfloor P/K \rfloor \tag{4}$$

Notes on equation (4):

- L_m: Midamble length
- K': Maximum number of different midamble shifts in a cell, when no intermediate shifts are used. This value depends on the midamble length.

- K: Maximum number of different midamble shifts in a cell, when intermediate shifts are used, K=2K'. This value depends on the midamble length.

Note that intermediate shifts are not used for burst type 4, i.e K=K'=1 for burst type 4

- W: Shift between the midambles, when the number of midambles is K'.
- \[\x \] denotes the largest integer smaller or equal to x

Allowed values for L_m, K' and W are given in Annex A.1 and A.2.

So we obtain a new vector \mathbf{m} containing the periodic basic midamble sequence:

$$\underline{\mathbf{m}} = \left(\underline{m}_1, \underline{m}_2, ..., \underline{m}_{i_{\text{max}}}\right) = \left(\underline{m}_1, \underline{m}_2, ..., \underline{m}_{L_m + (K'-1)W + |P/K|}\right)$$
(5)

The first P elements of this vector $\underline{\mathbf{m}}$ are the same ones as in vector $\underline{\mathbf{m}}_P$, the following elements repeat the beginning:

$$\underline{m}_{i} = \underline{m}_{i-P} \text{ for the subset } i = (P+1), \dots, i_{\text{max}}$$
 (6)

Using this periodic basic midamble sequence $\underline{\mathbf{m}}$ for each shift k a midamble $\underline{\mathbf{m}}^{(k)}$ of length L_m is derived, which can be written as a shift specific vector:

$$\underline{\mathbf{m}}^{(k)} = \left(\underline{m}_1^{(k)}, \underline{m}_2^{(k)}, \dots, \underline{m}_{L_m}^{(k)}\right) \tag{7}$$

The L_m midamble elements $\underline{m}_i^{(k)}$ are generated for each midamble of the first K' shifts (k = 1,...,K') based on:

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K'-k)W} \text{ with } i = 1,...,L_{m} \text{ and } k = 1,...,K'$$
 (8)

The elements of midambles for the second K' shifts (k = (K'+1),...,K = (K'+1),...,2K') are generated based on a slight modification of this formula introducing intermediate shifts:

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K-k-1)W+\lfloor P/K \rfloor}$$
 with $i = 1,..., L_{m}$ and $k = K'+1,...,K-1$ (9)

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K'-1)W+\lfloor P/K \rfloor} \text{ with } i = 1, \dots, L_{m} \text{ and } k = K$$

$$\tag{10}$$

The number K_{Cell} of midambles that is supported in each cell can be smaller than K, depending on the cell size and the possible delay spreads, see annex A. The number K_{Cell} is signalled by higher layers. The midamble sequences derived according to equations (7) to (10) have complex values and are not subject to channelisation or scrambling process, i.e. the elements $\underline{m}_{i}^{(k)}$ represent complex chips for usage in the pulse shaping process at modulation.

The term 'a midamble code set' or 'a midamble code family' denotes K specific midamble codes $\underline{\mathbf{m}}^{(k)}$; k=1,...,K, based on a single basic midamble code \mathbf{m}_p according to (1).

5.2.4 Beamforming

When DL beamforming is used, at least that user to which beamforming is applied and which has a dedicated channel shall get one individual midamble according to subclause 5.2.3, even in DL. DL beamforming is not applied to timeslots containing burst type 4.

5.3 Common physical channels

5.3.1 Primary common control physical channel (P-CCPCH)

The BCH as described in subclause 4.1.2 is mapped onto the Primary Common Control Physical Channel (P-CCPCH). The position (time slot / code) of the P-CCPCH is known from the Physical Synchronisation Channel (PSCH), see subclause 5.3.4.

5.3.1.1 P-CCPCH Spreading

The P-CCPCH uses fixed spreading with a spreading factor SF = 16 as described in subclause 5.2.1.1. The P-CCPCH always uses channelisation code $C_{O=16}^{(k=1)}$.

5.3.1.2 P-CCPCH Burst Types

The burst type 1 as described in subclause 5.2.2 is used for the P-CCPCH unless the entire carrier is dedicated to MBSFN then burst type 4 is used for P-CCPCH. No TFCI is applied for the P-CCPCH.

5.3.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5.2.3 are used for the P-CCPCH.

5.3.2 Secondary common control physical channel (S-CCPCH)

PCH and FACH as described in subclause 4.1.2 are mapped onto one or more secondary common control physical channels (S-CCPCH). In this way the capacity of PCH and FACH can be adapted to the different requirements.

5.3.2.1 S-CCPCH Spreading

The S-CCPCH uses fixed spreading with a spreading factor SF = 16 as described in subclause 5.2.1.1. When S-CCPCH is used for MBSFN operation the spreading factor may be SF = 16 or SF = 1.

5.3.2.2 S-CCPCH Burst Types

The burst types 1,2 or 4 as described in subclause 5.2.2 are used for the S-CCPCHs. TFCI may be applied for S-CCPCHs.

5.3.2.2A S-CCPCH Modulation

When S-CCPCH is used for MBSFN operation, burst type 4 shall be used and the modulation may be QPSK or 16QAM, see table 5A for slot formats. When S-CCPCH is used for all other purposes the modulation shall be QPSK.

5.3.2.3 S-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5.2.3 are used for the S-CCPCH.

5.3.3 The physical random access channel (PRACH)

The RACH as described in subclause 4.1.2 is mapped onto one uplink physical random access channel (PRACH).

5.3.3.1 PRACH Spreading

The uplink PRACH uses either spreading factor SF=16 or SF=8 as described in subclause 5.2.1.2. The set of admissible spreading codes for use on the PRACH and the associated spreading factors are broadcast on the BCH (within the RACH configuration parameters on the BCH).

5.3.3.2 PRACH Burst Type

The UEs send uplink access bursts of type 3 randomly in the PRACH. TFCI and TPC are not applied for the PRACH.

5.3.3.3 PRACH Training sequences

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of a single periodic basic code. The basic midamble codes for burst type 3 are shown in Annex A. The necessary time shifts are obtained by choosing either *all* k=1,2,3...,K' (for cells with small radius) or *uneven* $k=1,3,5,... \le K'$ (for cells with large radius). Different cells use different periodic basic codes, i.e. different midamble sets.

For cells with large radius additional midambles may be derived from the time-inverted Basic Midamble Sequence. Thus, the second Basic Midamble Code m_2 is the time inverted version of Basic Midamble Code m_1 .

In this way, a joint channel estimation for the channel impulse responses of all active users within one time slot can be performed by a maximum of two cyclic correlations (in cells with small radius, a single cyclic correlator suffices). The different user specific channel impulse response estimates are obtained sequentially in time at the output of the cyclic correlators.

5.3.3.4 PRACH timeslot formats

For the PRACH the timeslot format is only spreading factor dependent. The timeslot formats 60 and 66 of table 5b are applicable for the PRACH.

5.3.3.5 Association between Training Sequences and Channelisation Codes

For the PRACH there exists a fixed association between the training sequence and the channelisation code. The generic rule to define this association is based on the order of the channelisation codes $\mathbf{c}_{Q}^{(k)}$ given by k and the order of the midambles $\mathbf{m}_{j}^{(k)}$ given by k, firstly, and j, secondly, with the constraint that the midamble for a spreading factor Q is the same as in the upper branch for the spreading factor 2Q. The index j=1 or 2 indicates whether the original Basic Midamble Sequence (j=1) or the time-inverted Basic Midamble Sequence is used (j=2).

- For the case that all *k* are allowed and only one periodic basic code m₁ is available for the RACH, the association depicted in figure 12 is straightforward.
- For the case that only odd *k* are allowed the principle of the association is shown in figure 13. This association is applied for one and two basic periodic codes.

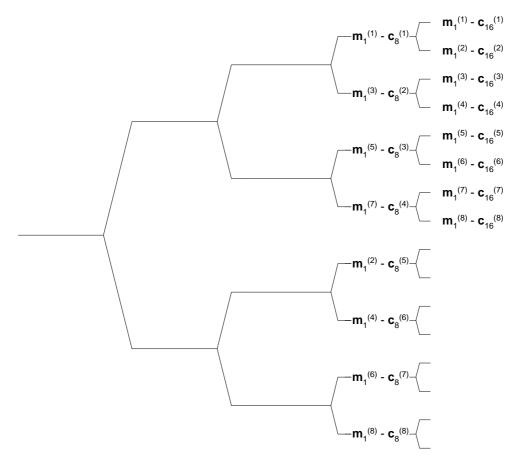


Figure 12: Association of Midambles to Channelisation Codes in the OVSF tree for all k

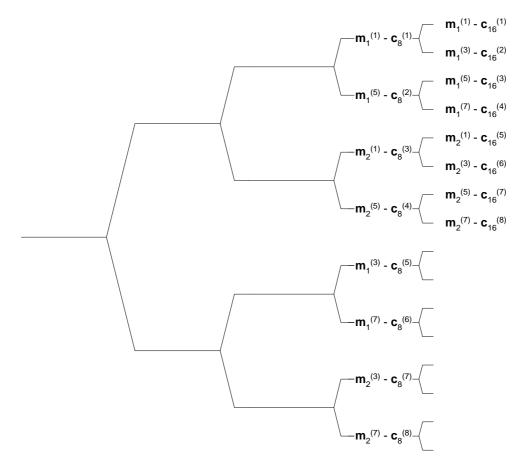


Figure 13: Association of Midambles to Channelisation Codes in the OVSF tree for odd k

5.3.4 The synchronisation channel (SCH)

In TDD mode code group of a cell can be derived from the synchronisation channel. In order not to limit the uplink/downlink asymmetry the SCH is mapped on one or two downlink slots per frame only.

There are two cases of SCH and P-CCPCH allocation as follows:

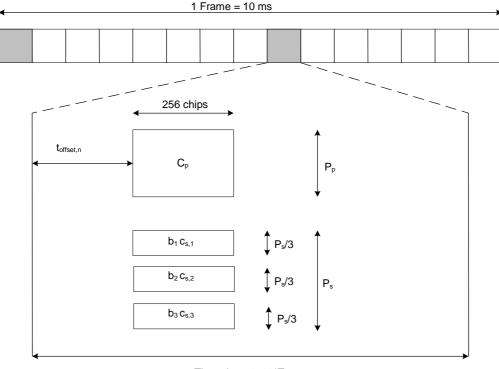
- Case 1) SCH and P-CCPCH allocated in TS#k, k=0....14
- Case 2) SCH allocated in two TS: TS#k and TS#k+8, k=0...6; P-CCPCH allocated in TS#k.

Only case 1 is supported in the case that the entire carrier is dedicated to MBSFN.

The position of SCH (value of k) in frame can change on a long term basis in any case.

Due to this SCH scheme, the position of P-CCPCH is known from the SCH.

Figure 14 is an example for transmission of SCH, k=0, of Case 2.



Time slot = $2560*T_c$

 $b_i \in \{\pm 1, \pm j\}, C_{s,i} \in \{C_0, C_1, C_3, C_4, C_5, C_6, C_8, C_{10}, C_{12}, C_{13}, C_{14}, C_{15}\}, i=1,2,3; see [8]$

Figure 14: Scheme for Synchronisation channel SCH consisting of one primary sequence C_p and 3 parallel secondary sequences $C_{s,i}$ in slot k and k+8 (example for k=0 in Case 2)

As depicted in figure 14, the SCH consists of a primary and three secondary code sequences each 256 chips long. The primary and secondary code sequences are defined in [8] clause 7 'Synchronisation codes for the 3.84 Mcps option'.

Due to mobile interference, it is mandatory for public TDD systems to keep synchronisation between base stations. As a consequence of this, a capture effect concerning SCH can arise. The time offset $t_{\text{offset},n}$ enables the system to overcome the capture effect.

The time offset $t_{offset,n}$ is one of 32 values, depending on the code group of the cell, n, cf. 'table 6 Mapping scheme for Cell Parameters, Code Groups, Scrambling Codes, Midambles and t_{offset} ' in [8]. Note that the cell parameter will change from frame to frame, cf. 'Table 7 Alignment of cell parameter cycling and system frame number' in [8], but the cell will belong to only one code group and thus have one time offset $t_{offset,n}$. The exact value for $t_{offset,n}$, regarding column 'Associated t_{offset} ' in table 6 in [8] is given by:

$$t_{offset,n} = \begin{cases} n \cdot 48 \cdot T_c & n < 16 \\ (720 + n \cdot 48)T_c & n \ge 16 \end{cases}; \quad n = 0,, 31$$

5.3.5 Physical Uplink Shared Channel (PUSCH)

The USCH as desribed in subclause 4.1.2 is mapped onto one or more physical uplink shared channels (PUSCH). Timing advance, as described in [9], subclause 4.3, is applied to the PUSCH.

5.3.5.1 PUSCH Spreading

The spreading factors that can be applied to the PUSCH are SF = 1, 2, 4, 8, 16 as described in subclause 5.2.1.2.

5.3.5.2 PUSCH Burst Types

Burst types 1, 2 or 3 as described in subclause 5.2.2 can be used for PUSCH. TFCI and TPC can be transmitted on the PUSCH.

5.3.5.3 PUSCH Training Sequences

The training sequences as desribed in subclause 5.2.3 are used for the PUSCH.

5.3.5.4 UE Selection

The UE that shall transmit on the PUSCH is selected by higher layer signalling.

5.3.6 Physical Downlink Shared Channel (PDSCH)

The DSCH as described in subclause 4.1.2 is mapped onto one or more physical downlink shared channels (PDSCH).

5.3.6.1 PDSCH Spreading

The PDSCH uses either spreading factor SF = 16 or SF = 1 as described in subclause 5.2.1.1.

5.3.6.2 PDSCH Burst Types

Burst types 1 or 2 as described in subclause 5.2.2 can be used for PDSCH. TFCI can be transmitted on the PDSCH.

5.3.6.3 PDSCH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the PDSCH.

5.3.6.4 UE Selection

To indicate to the UE that there is data to decode on the DSCH, three signalling methods are available:

- 1) using the TFCI field of the associated channel or PDSCH;
- 2) using on the DSCH user specific midamble derived from the set of midambles used for that cell;
- 3) using higher layer signalling.

When the midamble based method is used, the UE specific midamble allocation method shall be employed (see subclause 5.6), and the UE shall decode the PDSCH if the PDSCH was transmitted with the midamble assigned to the UE by UTRAN. For this method no other physical channels may use the same time slot as the PDSCH and only one UE may share the PDSCH time slot within one TTI.

Note: From the above mentioned signalling methods, only the higher layer signalling method is supported by higher layers in this release.

5.3.7 The Paging Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

5.3.7.1 Mapping of Paging Indicators to the PICH bits

Figure 15 depicts the structure of a PICH burst and the numbering of the bits within the burst. The same burst type is used for the PICH in every cell. N_{PIB} bits in a normal burst of type 1 or 2 are used to carry the paging indicators, where N_{PIB} depends on the burst type: N_{PIB} =240 for burst type 1 and N_{PIB} =272 for burst type 2. The bits s_{NPIB+1} ,..., s_{NPIB+4} adjacent to the midamble are reserved for possible future use.

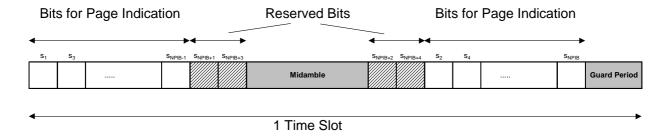


Figure 15: Transmission and numbering of paging indicator carrying bits in a PICH burst

Each paging indicator P_q in one time slot is mapped to the bits $\{s_{2Lpi^*q+1},...,s_{2Lpi^*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each paging indicator are transmitted in the first data part, and the other half of the symbols are transmitted in the second data part, as exemplary shown in figure 16 for a paging indicator length L_{PI} of 4 symbols.

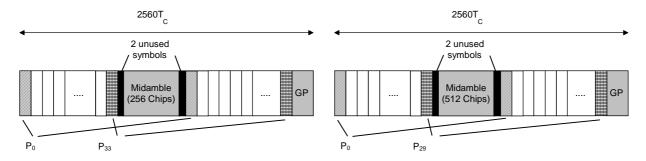


Figure 16: Example of mapping of paging indicators on PICH bits for L_{PI}=4

The setting of the paging indicators and the corresponding PICH bits (including the reserved ones) is described in [7].

 N_{PI} paging indicators of length L_{PI} =2, L_{PI} =4 or L_{PI} =8 symbols are transmitted in each radio frame that contains the PICH. The number of paging indicators N_{PI} per radio frame is given by the paging indicator length and the burst type, which are both known by higher layer signalling. In table 7 this number is shown for the different possibilities of burst types and paging indicator lengths.

Table 7: Number N_{Pl} of paging indicators per time slot for the different burst types and paging indicator lengths L_{Pl}

	L _{PI} =2	L _{PI} =4	L _{PI} =8
Burst Type 1	N _{PI} =60	N _{PI} =30	N _{PI} =15
Burst Type 2	N _{PI} =68	N _{PI} =34	N _{Pl} =17

5.3.7.2 Structure of the PICH over multiple radio frames

As shown in figure 17, the paging indicators of N_{PICH} consecutive frames form a PICH block, N_{PICH} is configured by higher layers. Thus, $N_P = N_{PICH} * N_{PI}$ paging indicators are transmitted in each PICH block.

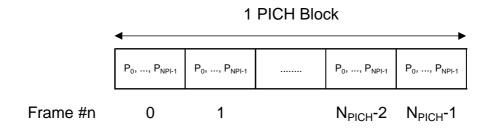


Figure 17: Structure of a PICH block

The value PI (PI = 0, ..., N_P -1) calculated by higher layers for use for a certain UE, see [15], is associated to the paging indicator P_q in the nth frame of one PICH block, where q is given by

$$q = PI \mod N_{PI}$$

and n is given by

$$n = PI \text{ div } N_{PI}$$
.

The PI bitmap in the PCH data frames over Iub contains indication values for all possible higher layer PI values, see [17]. Each bit in the bitmap indicates if the paging indicator P_q associated with that particular PI shall be set to 0 or 1. Hence, the calculation in the formulas above is to be performed in Node B to make the association between PI and P_q .

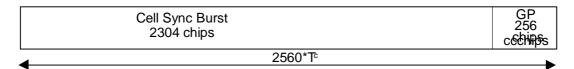
5.3.7.3 PICH Training sequences

The training sequences, i.e. midambles for the PICH.are generated as described in subclause 5.2.3. The allocation of midambles depends on whether SCTD is applied to the PICH.

- If no antenna diversity is applied the PICH the midambles can be allocated as described in subclause 5.6.
- If SCTD antenna diversity is applied to the PICH the allocation of midambles shall be as described in [9].

5.3.8 The physical node B synchronisation channel (PNBSCH)

In case cell sync bursts are used for Node B synchronisation the PNBSCH shall be used for the transmission of the cell sync burst [8]. The PNBSCH shall be mapped on the same timeslot as the PRACH acc. to a higher layer schedule. The cell sync burst shall be transmitted at the beginning of a timeslot. In case of Node B synchronisation via the air interface the transmission of a RACH may be prohibited on higher layer command in specified frames and timeslots.



5.3.9 High Speed Physical Downlink Shared Channel (HS-PDSCH)

The HS-DSCH as desribed in subclause 4.1.2 is mapped onto one or more high speed physical downlink shared channels (HS-PDSCH).

5.3.9.1 HS-PDSCH Spreading

The HS-PDSCH shall use either spreading factor SF = 16 or SF=1, as described in 5.2.1.1.

5.3.9.2 HS-PDSCH Burst Types

Burst types 1 or 2 as described in subclause 5.2.2 can be used for PDSCH. TFCI shall not be transmitted on the HS-PDSCH. The TF of the HS-DSCH is derived from the associated HS-SCCH.

5.3.9.3 HS-PDSCH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the HS-PDSCH.

5.3.9.4 UE Selection

To indicate to the UE that there is data to decode on the HS-DSCH, the UE id on the associated HS-SCCH shall be used.

5.3.9.5 HS-PDSCH timeslot formats

An HS-PDSCH may use QPSK or 16QAM modulation symbols. The time slot formats are shown in table 7A.

4416

Slot Format Midamble Bits/slot **Spreading** N_{TFCI code word} N_{Data/Slot} N_{data/data field} **Factor** length (bits) (bits) (bits) (chips) 0 (QPSK) 512 122 16 0 244 244 1 (16QAM) 16 512 0 488 488 244 2 (QPSK) 16 256 0 276 276 138 3 (16QAM) 16 256 0 552 552 276 4 (QPSK) 1 512 0 3904 3904 1952 5 (16QAM) 512 7808 7808 3904 1 0 6 (QPSK) 1 256 0 4416 4416 2208

0

8832

8832

Table 7A: Time slot formats for the HS-PDSCH

5.3.10 Shared Control Channel for HS-DSCH (HS-SCCH)

256

The HS-SCCH is a DL physical channel that carries higher layer control information for HS-DSCH. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SCCH the structure of which is described below.

5.3.10.1 HS-SCCH Spreading

1

7(16QAM)

The HS-SCCH shall use spreading factor SF = 16, as described in 5.2.1.1.

5.3.10.2 HS-SCCH Burst Types

Burst type 1 as described in subclause 5.2.2 can be used for HS-SCCH. TFCI shall not be transmitted on the HS-SCCH.

5.3.10.3 HS-SCCH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the HS-SCCH.

5.3.10.4 HS-SCCH timeslot formats

The HS-SCCH always uses time slot format #0 from table 5a, see section 5.2.2.6.1.

5.3.11 Shared Information Channel for HS-DSCH (HS-SICH)

The HS-SICH is a UL physical channel that carries higher layer control information and the Channel Quality Indicator CQI for HS-DSCH. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SICH the structure of which is described below.

5.3.11.1 HS-SICH Spreading

The HS-SICH shall use spreading factor SF = 16, as described in 5.2.1.2.

5.3.11.2 HS-SICH Burst Types

Burst type 1 as described in subclause 5.2.2 can be used for HS-SICH. TFCI shall not be transmitted on the HS-SICH, however, the HS-SICH shall carry TPC information.

5.3.11.3 HS-SICH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the HS-SICH.

5.3.11.4 HS-SICH timeslot formats

The HS-SICH shall use time slot format #90 from table 5b, see section 5.2.2.6.2.

5.3.12 The MBMS Indicator Channel (MICH)

The MBMS Indicator Channel (MICH) is a physical channel used to carry the MBMS notification indicators. The UE may use multiple MICH within the MBMS modification period in order to make decisions on individual MBMS notification indicators.

5.3.12.1 Mapping of MBMS Indicators to the MICH bits for burst types 1 and 2

Figure 17a depicts the structure of a MICH burst and the numbering of the bits within the burst. The same burst type is used for the MICH in every cell. N_{NIB} bits in a normal burst of type 1 or 2 are used to carry the MBMS notification indicators, where N_{NIB} depends on the burst type: N_{NIB} =240 for burst type 1 and N_{NIB} =272 for burst type 2. The bits s_{NNIB+1} ,..., s_{NNIB+4} adjacent to the midamble are reserved for possible future use.

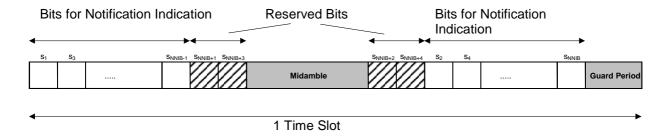


Figure 17a: Transmission and numbering of MBMS notification indicator carrying bits in a MICH burst using burst types 1 and 2

Each notification indicator N_q in one time slot is mapped to the bits $\{s_{2LNI^*q+1},...,s_{2LNI^*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each MBMS notification indicator are transmitted in the first data part, and the other half of the symbols are transmitted in the second data part: an example is shown in figure 17b for a MBMS notification indicator length L_{NI} of 4 symbols.

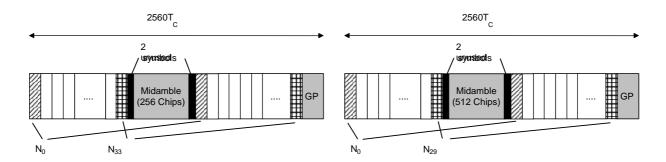


Figure 17b: Example of mapping of MBMS notification indicators on MICH bits for L_{Ni} =4 for burst types 2 and 1 respectively

The setting of the MBMS notification indicators and the corresponding MICH bits (including the reserved ones) is described in [7].

 N_n MBMS notification indicators of length L_{NI} =2, L_{NI} =4 or L_{NI} =8 symbols are transmitted in each MICH. The number of MBMS notification indicators N_n per MICH is given by the MBMS notification indicator length and the burst type, which are both known by higher layer signalling. In table 7B this number is shown for burst types 1 and 2 and differing MBMS notification indicator lengths.

Table 7B: Number N_n of MBMS notification indicators per time slot for the different burst types 1 and 2 and differing MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
Burst Type 1	N _n =60	N _n =30	$N_n=15$
Burst Type 2	N _n =68	N _n =34	N _n =17

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = NI \mod N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on MICH should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5.3.12.1A Mapping of MBMS Indicators to the MICH bits for burst type 4

When an entire carrier is dedicated to MBSFN operation, the MICH shall use burst type 4. In this case N_{NIB} =256 and there are 8 reserved/unused bits adjacent to the midamble reserved for possible future use. The transmission and numbering of MBMS notification indicator carrying bits in a MICH burst is similar to that of figure 17a with the exception of 4 reserved bits either side of the midamble as opposed to 2 for burst types 1 and 2. An example mapping is shown in figure 17ba for a MBMS notification indicator length L_{NI} of 4 symbols.

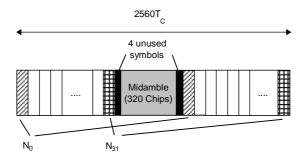


Figure 17ba: Example of mapping of MBMS notification indicators on MICH bits for L_{Ni} =4 for burst type 4

The setting of the MBMS notification indicators and the corresponding MICH bits (including the reserved ones) is described in [7].

 N_n MBMS notification indicators of length L_{NI} =2, L_{NI} =4 or L_{NI} =8 symbols are transmitted in each MICH. The number of MBMS notification indicators N_n per MICH is given by the MBMS notification indicator length and the burst type, which are both known by higher layer signalling. In table 7BA this number is shown for the different possibilities of burst types and MBMS notification indicator lengths.

Table 7BA: Number N_n of MBMS notification indicators per time slot for burst type 4 and differing MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
Burst Type 4	N _n =64	N _n =32	N _n =16

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = NI \mod N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on MICH should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5.3.12.2 MICH Training sequences

The training sequences, i.e. midambles for the MICH, are generated as described in subclause 5.2.3. The allocation of midambles depends on whether SCTD is applied to the MICH.

- If no antenna diversity is applied the MICH the midambles can be allocated as described in subclause 5.6.
- If SCTD antenna diversity is applied to the MICH the allocation of midambles shall be as described in [9].

Note that when the entire carrier is dedicated to MBSFN operation MICH employs burst type 4 as described in subclause 5.3.12.1A. Burst type 4 supports a single midamble and hence SCTD is precluded from operation in such a scenario.

5.3.13 E-DCH Physical Uplink Channel (E-PUCH)

One or more E-PUCH are used to carry the uplink E-DCH transport channel and associated control information (E-UCCH) in each E-DCH TTI. In a timeslot designated by UTRAN for E-PUCH use, up to one E-PUCH may be transmitted by a UE. No other physical channels may be transmitted by a UE in an E-PUCH timeslot.

Timing advance, as described in [9], subclause 4.3, is applied to the E-PUCH.

5.3.13.1 E-UCCH

The E-DCH Uplink Control Channel (E-UCCH) carries uplink control information associated with the E-DCH and is carried within indicator fields mapped to E-PUCH. Depending on the configuration by higher layers, an E-PUCH burst may or may not contain E-UCCH and TPC. When E-PUCH does contain E-UCCH, TPC is also transmitted. When E-PUCH does not contain E-UCCH, TPC is not transmitted.

Higher layers shall indicate the maximum number of timeslots (N_{E-UCCH}) that may contain E-UCCH/TPC in the E-DCH TTI. For an allocation of n_{TS} E-PUCH timeslots, the UE shall transmit E-UCCH and TPC on the first m allocated timeslots of the E-DCH TTI, where $m = \min(n_{TS}, N_{E-UCCH})$.

The E-UCCH comprises two parts, E-UCCH part 1 and E-UCCH part 2.

E-UCCH part 1:

- is of length 32 physical channel bits
- is mapped to the TFCI field of the E-PUCH (16 bits either side of the midamble)
- is spread at SF=16 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]
- uses QPSK modulation

E-UCCH part 2:

- is of length 32 physical channel bits
- is spread using the same spreading factor as the data payloads
- uses the same modulation as the data payloads

Figures 17c and 17d show the E-PUCH data burst with and without the E-UCCH/TPC fields.

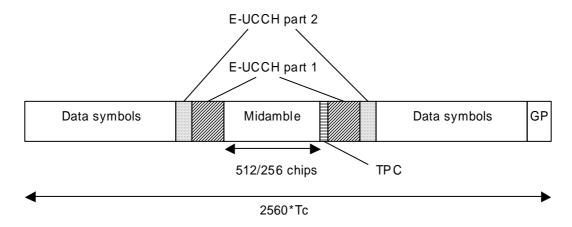


Figure 17c: Location of E-UCCH part 1, E-UCCH part 2 and TPC in the E-PUCH data burst

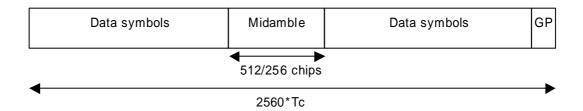


Figure 17d: E-PUCH data burst without E-UCCH/TPC

5.3.13.2 E-PUCH Spreading

The spreading factors that can be applied to the E-PUCH are SF = 1, 2, 4, 8, 16 as described in subclause 5.2.1.2.

5.3.13.3 E-PUCH Burst Types

Burst types 1, 2 or 3 as described in subclause 5.2.2 can be used for E-PUCH. E-UCCH and TPC can be transmitted on the E-PUCH.

5.3.13.4 PUSCH Training Sequences

The training sequences as desribed in subclause 5.2.3 are used for the E-PUCH.

5.3.13.5 UE Selection

UEs that shall transmit on the E-PUCH are selected by higher layers. The UE id on the associated E-AGCH shall be used for identification.

5.3.13.6 E-PUCH timeslot formats

An E-PUCH may use QPSK or 16QAM modulation symbols and may or may not contain E-UCCH/TPC. The time slot formats are shown in table 7c.

Table 7c: Timeslot formats for E-PUCH

slot format #	SF	Midamble Length (chips)	GP (chips)	N _{EUCCH1} (bits)	N _{EUCCH2} (bits)	N _{TPC} (bits)	Bits/slot	N _{data/slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0 (QPSK)	16	512	96	0	0	0	244	244	122	122
1 (16QAM)	16	512	96	0	0	0	488	488	244	244
2 (QPSK)	16	512	96	32	32	2	244	178	90	88
3 (16QAM)	16	512	96	32	32	2	454	388	196	192
4 (QPSK)	16	256	96	0	0	0	276	276	138	138
5 (16QAM)	16	256	96	0	0	0	552	552	276	276
6 (QPSK)	16	256	96	32	32	2	276	210	106	104
7 (16QAM)	16	256	96	32	32	2	518	452	228	224
8 (QPSK)	8	512	96	0	0	0	488	488	244	244
9 (16QAM)	8	512	96	0	0	0	976	976	488	488
10 (QPSK)	8	512	96	32	32	2	454	388	196	192
11 (16QAM)	8	512	96	32	32	2	874	808	408	400
12 (QPSK)	8	256	96	0	0	0	552	552	276	276
13 (16QAM)	8	256	96	0	0	0	1104	1104	552	552
14 (QPSK)	8	256	96	32	32	2	518	452	228	224
15 (16QAM)	8	256	96	32	32	2	1002	936	472	464
16 (QPSK)	4	512	96	0	0	0	976	976	488	488
17 (16QAM)	4	512	96	0	0	0	1952	1952	976	976
18 (QPSK)	4	512	96	32	32	2	874	808	408	400
19 (16QAM)	4	512	96	32	32	2	1714	1648	832	816
20 (QPSK)	4	256	96	0	0	0	1104	1104	552	552
21 (16QAM)	4	256	96	0	0	0	2208	2208	1104	1104
22 (QPSK)	4	256	96	32	32	2	1002	936	472	464
23 (16QAM)	4	256	96	32	32	2	1970	1904	960	944
24 (QPSK)	2	512	96	0	0	0	1952	1952	976	976
25 (16QAM)	2	512	96	0	0	0	3904	3904	1952	1952
26 (QPSK)	2	512	96	32	32	2	1714	1648	832	816
27 (16QAM)	2	512	96	32	32	2	3394	3328	1680	1648
28 (QPSK)	2	256	96	0	0	0	2208	2208	1104	1104
29 (16QAM)	2	256	96	0	0	0	4416	4416	2208	2208
30 (QPSK)	2	256	96	32	32	2	1970	1904	960	944
31 (16QAM)	2	256	96	32	32	2	3906	3840	1936	1904
32 (QPSK)	1	512	96	0	0	0	3904	3904	1952	1952
33 (16QAM)	1	512	96	0	0	0	7808	7808	3904	3904
34 (QPSK)	1	512	96	32	32	2	3394	3328	1680	1648
35 (16QAM)	1	512	96	32	32	2	6754	6688	3376	3312
36 (QPSK)	1	256	96	0	0	0	4416	4416	2208	2208
37 (16QAM)	1	256	96	0	0	0	8832	8832	4416	4416
38 (QPSK)	1	256	96	32	32	2	3906	3840	1936	1904
39 (16QAM)	1	256	96	32	32	2	7778	7712	3888	3824
40 (QPSK)	16	512	192	0	0	0	232	232	122	110
41 (16QAM)	16	512	192	0	0	0	464	464	244	220
42 (QPSK)	16	512	192	32	32	2	232	166	90	76
43 (16QAM)	16	512	192	32	32	2	430	364	196	168
44 (QPSK)	8	512	192	0	0	0	464	464	244	220
45 (16QAM)	8	512	192	0	0	0	928	928	488	440

slot format #	SF	Midamble Length (chips)	GP (chips)	N _{EUCCH1} (bits)	N _{EUCCH2} (bits)	N _{TPC} (bits)	Bits/slot	N _{data/slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
46 (QPSK)	8	512	192	32	32	2	430	364	196	168
47 (16QAM)	8	512	192	32	32	2	826	760	408	352
48 (QPSK)	4	512	192	0	0	0	928	928	488	440
49 (16QAM)	4	512	192	0	0	0	1856	1856	976	880
50 (QPSK)	4	512	192	32	32	2	826	760	408	352
51 (16QAM)	4	512	192	32	32	2	1618	1552	832	720
52 (QPSK)	2	512	192	0	0	0	1856	1856	976	880
53 (16QAM)	2	512	192	0	0	0	3712	3712	1952	1760
54 (QPSK)	2	512	192	32	32	2	1618	1552	832	720
55 (16QAM)	2	512	192	32	32	2	3202	3136	1680	1456
56 (QPSK)	1	512	192	0	0	0	3712	3712	1952	1760
57 (16QAM)	1	512	192	0	0	0	7424	7424	3904	3520
58 (QPSK)	1	512	192	32	32	2	3202	3136	1680	1456
59 (16QAM)	1	512	192	32	32	2	6370	6304	3376	2928

5.3.14 E-DCH Random Access Uplink Control Channel (E-RUCCH)

The E-RUCCH is used to carry E-DCH-associated uplink control signalling when E-PUCH resources are not available. The characteristics of the E-RUCCH physical channel are identical to those of PRACH (see subclause 5.3.3).

Physical resources available for E-RUCCH are configured by higher layers. E-RUCCH may be mapped to the same physical resources that are assigned for PRACH.

5.3.15 E-DCH Absolute Grant Channel (E-AGCH)

The E-DCH Absolute Grant Channel (E-AGCH) is a downlink physical channel carrying the uplink E-DCH absolute grant control information. E-AGCH carries a TPC field (located immediately after the midamble and spread using SF16) which is used to control the E-PUCH power. Figure 17e illustrates the burst structure of the E-AGCH.

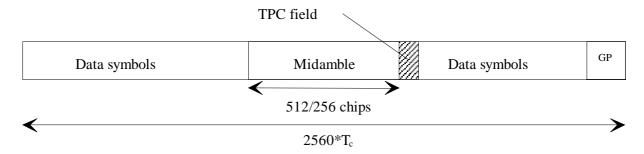


Figure 17e: Burst structure of E-AGCH

One E-DCH absolute grant for a UE shall be transmitted over one E-AGCH.

5.3.15.1 E-AGCH Spreading

The E-AGCH shall use spreading factor SF = 16, as described in 5.2.1.1.

5.3.15.2 E-AGCH Burst Types

Burst types 1 and 2 as described in subclause 5.2.2 can be used for E-AGCH. TPC shall be transmitted on E-AGCH whereas TFCI shall not be transmitted.

5.3.15.3 E-AGCH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the E-AGCH.

5.3.15.4 E-AGCH timeslot formats

The E-AGCH uses the timeslot formats of Table 7d. These augment downlink slot formats 0...19 of table 5a, see subclause 5.2.2.6.1.

Slot SF Midamble N_{TFCI code word} N_{TPC} (bits) Bits/slot N_{Data/Slot} N_{data/data} N_{data/data} **Format** length (bits) (bits) field (1) field (2) (chips) (bits) (bits) 20 16 512 0 2 244 242 122 120 256 21 276 274 138 16 0 136

Table 7d: Time slot formats for E-AGCH

5.3.16 E-DCH Hybrid ARQ Acknowledgement Indicator Channel (E-HICH)

The E-DCH HARQ Acknowledgement indicator channel (E-HICH) is defined in terms of a SF16 downlink physical channel and a signature sequence. The E-HICH carries the uplink E-DCH hybrid ARQ acknowledgement indicator. Figure 17f illustrates the structure of the E-HICH.

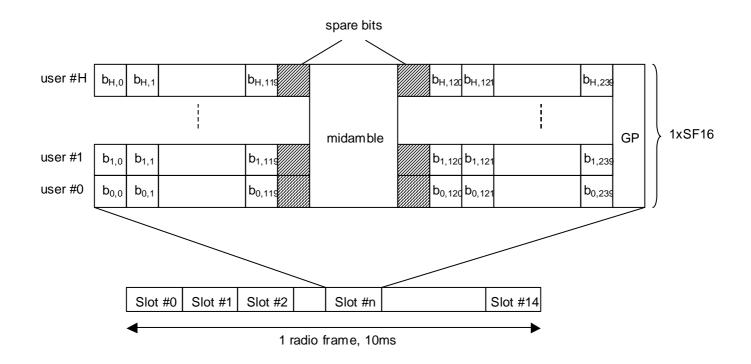


Figure 17f - E-HICH Structure

A single channelisation code may carry one or multiple signature sequences. Each signature sequence conveys a HARQ acknowledgement indicator. A maximum of one indicator may be transmitted to a UE. Each acknowledgement indicator is coded to form a signature sequence of 240 bits $(b_0, b_1, \ldots, b_{239})$ as defined in [7] and is transmitted within a single E-HICH timeslot. The E-HICH also contains U spare bit locations, where U=4 for burst type 1 and U=36 for burst type 2. The spare bit values are not defined.

5.3.16.1 E-HICH Spreading

Signature sequences (including spare bits inserted) that share the same channelisation code are combined and spread using spreading factor SF=16 as described in [8].

5.3.16.2 E-HICH Burst Types

Burst types 1 and 2 as described in subclause 5.2.2 can be used for E-HICH. Neither TFCI nor TPC shall be transmitted on the E-HICH.

5.3.16.3 E-HICH Training Sequences

The training sequences as described in subclause 5.2.3 are used for the E-HICH.

5.4 Transmit Diversity for DL Physical Channels

Table 8 summarizes the different transmit diversity schemes for different downlink physical channel types that are described in [9].

Table 8: Application of Tx diversity schemes on downlink physical channel types "X" – can be applied, "–" – must not be applied

Physical channel type	Open loop	TxDiversity	Closed loop TxDiversity
	TSTD	SCTD ^(*)	
P-CCPCH	_	X(†)	_
S-CCPCH	X(**)	X(†)	
SCH	Х	_	_
DPCH	_	-	X
PDSCH	_	X	X
PICH	_	X	_
MICH	_	X(†)	_
HS-SCCH		X	X
HS-PDSCH		X	X
E-AGCH		Х	X
E-HICH		X	

^(*) Note: SCTD may only be applied to physical channels when they are allocated to beacon locations.

5.5 Beacon characteristics of physical channels

For the purpose of measurements, common physical channels that are allocated to particular locations (time slot, code) shall have particular physical characteristics, called beacon characteristics. Physical channels with beacon characteristics are called beacon channels. The locations of the beacon channels are called beacon locations. The ensemble of beacon channels shall provide the beacon function, i.e. a reference power level at the beacon locations, regularly existing in each radio frame. Thus, beacon channels must be present in each radio frame, the only exception is when idle periods are used to support time difference measurements for location services [9]. Then it may be possible that the beacon channels occur in the same frame and time slot as the idle periods. In this case, the beacon channels will not be transmitted in that particular frame and time slot.

5.5.1 Location of beacon channels

The beacon locations are determined by the SCH and depend on the SCH allocation case, see subclause 5.3.4:

Case 1) The beacon function shall be provided by the physical channels that are allocated to channelisation code $c_{Q=16}^{(k=1)}$ and to TS#k, k=0,...,14.

^(**) Note: TSTD may not be applied to S-CCPCH in beacon locations.

^(†) Note: that when the entire carrier is dedicated to MBSFN operation SCTD shall not be applied.

Case 2) The beacon function shall be provided by the physical channels that are allocated to channelisation code $c_{Q=16}^{(k=1)}$ and to TS#k and TS#k+8, k=0,...,6.

Note that by this definition the P-CCPCH always has beacon characteristics.

5.5.2 Physical characteristics of beacon channels

The beacon channels shall have the following physical characteristics. They:

- are transmitted with reference power;
- are transmitted without beamforming;
- use burst type 1 or burst type 4 when MBSFN is applied to beacon channels;
- use midamble m⁽¹⁾ and m⁽²⁾ exclusively in this time slot; and
- midambles m⁽⁹⁾ and m⁽¹⁰⁾ are always left unused in this time slot, if 16 midambles are allowed in that cell.

Note that in the time slot where the P-CCPCH is transmitted only the midambles $m^{(1)}$ to $m^{(8)}$ shall be used, see 5.6.1. Thus, midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot.

Note that when MBSFN is applied to beacon channels there is a single midamble and hence midamble $m^{(1)}$ is exclusively used in the timeslot.

The reference power corresponds to the sum of the power allocated to both midambles $m^{(1)}$ and $m^{(2)}$. Two possibilities exist:

- If SCTD antenna diversity is not applied to beacon channels all the reference power of any beacon channel is allocated to m⁽¹⁾.
- If SCTD antenna diversity is applied to beacon channels, for any beacon channel midambles m⁽¹⁾ and m⁽²⁾ are each allocated half of the reference power.

5.6 Midamble Allocation for Physical Channels

Midambles are part of the physical channel configuration which is performed by higher layers. Three different midamble allocation schemes exist:

- UE specific midamble allocation: A UE specific midamble for DL or UL is explicitly assigned by higher layers.
- Default midamble allocation: The midamble for DL or UL is allocated by layer 1 depending on the associated channelisation code.
- Common midamble allocation: The midamble for the DL is allocated by layer 1 depending on the number of channelisation codes currently being present in the DL time slot.

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the midamble shall be allocated by layer 1, based on the default midamble allocation scheme. This default midamble allocation scheme is given by a fixed association between midambles and channelisation codes, see clause A.3, and shall be applied individually to all channelisation codes within one time slot. Different associations apply for different burst types and cell configurations with respect to the maximum number of midambles.

For timeslots employing MBSFN operation burst type 4 is used and hence DL beamforming is not applied, subclause 5.2.4. Furthermore, as this burst type contains only a single midamble, i.e. $K_{Cell}=1$, then all physical channels in such timeslots employ the same midamble and thus default and common midamble allocation amount to the same allocation strategies.

5.6.1 Midamble Allocation for DL Physical Channels

Beacon channels shall always use the reserved midambles m⁽¹⁾ and m⁽²⁾, see 5.5. For DL physical channels that are located in the same time slot as the P-CCPCH, midambles shall be allocated based on the default midamble allocation

scheme, using the association for burst type 1 and K_{Cell} =8 midambles. For all other DL physical channels, the midamble is explicitly assigned by higher layers or allocated by layer 1.

5.6.1.1 Midamble Allocation by signalling from higher layers

UE specific midambles may be signalled by higher layers to UE's as a part of the physical channel configuration, if:

- multiple UEs use the physical channels in one DL time slot; and
- beamforming is applied to all of these DL physical channels; and
- no closed loop TxDiversity is applied to any of these DL physical channels;

or

- PDSCH physical layer signalling based on the midamble is used.

5.6.1.2 Midamble Allocation by layer 1

5.6.1.2.1 Default midamble

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the UE shall derive the midambles from the allocated channelisation codes and shall use an individual midamble for each channelisation code group containing one primary and a set of secondary channelisation codes. The association between midambles and channelisation code groups is given in annex A.3. All the secondary channelisation codes within a set use the same midamble as the primary channelisation code to which they are associated.

Higher layers shall allocate the channelisation codes in a particular order. Secondary codes shall only be allocated if the associated primary code is also allocated. If midambles are reserved for the beacon channels, all primary and secondary channelisation codes that are associated with the reserved midambles shall not be used.

Channelisation codes of one channelisation code group shall not be allocated to different UE's.

In the case that secondary channelisation codes are used, secondary channelisation codes of one channelisation code group shall be allocated in ascending order, with respect to their numbering, and beginning with the lowest code index in this channelisation code group.

The UE shall assume different channel estimates for each of the individual midambles.

The default midamble allocation shall not apply for those downlink channels that are intended for a UE which will be the only UE assigned to a given time slot or slots for the duration of the assigned channel's existence (as in the case of high rate services).

5.6.1.2.2 Common Midamble

The use of the common midamble allocation scheme is signalled to the UE by higher layers as a part of the physical channel configuration. A common midamble may be assigned by layer 1 to all physical channels in one DL time slot, if:

- a single UE uses all physical channels in one DL time slot (as in the case of high rate service);

or

- multiple UEs use the physical channels in one DL time slot; and
- no beamforming is applied to any of these DL physical channels; and
- no closed loop TxDiversity is applied to any of these DL physical channels; and
- midambles are not used for PDSCH physical layer signalling.

The number of channelisation codes currently employed in the DL time slot is associated with the use of a particular common midamble. Different associations apply for different burst types and cell configurations with respect to the maximum number of midambles, see annex B.

5.6.2 Midamble Allocation for UL Physical Channels

If the midamble is explicitly assigned by higher layers, an individual midamble shall be assigned to all UE's in one UL time slot.

If no midamble is explicitly assigned by higher layers, the UE shall derive the midamble from the channelisation code that is used for the data part (except for TFCI/TPC) of the burst. Note that in the event that code hopping is employed the midamble is derived from the channelisation code actually transmitted (i.e. the code used after the hop sequence has been applied – see [9]). The associations between midamble and channelisation code are the same as for DL physical channels.

5.7 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If SCTD is used for beacon channels, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.
- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.
- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure 18 depicts the midamble powers for the different channel types and midamble allocation schemes.

- Note 1: In figure 18, the codes c(1) to c(16) represent the set of usable codes and not the set of used codes.
- Note 2: The common midamble allocation and the midamble allocation by higher layers are not applicable in those beacon time slots, in which the P-CCPCH is located, see section 5.6.1.

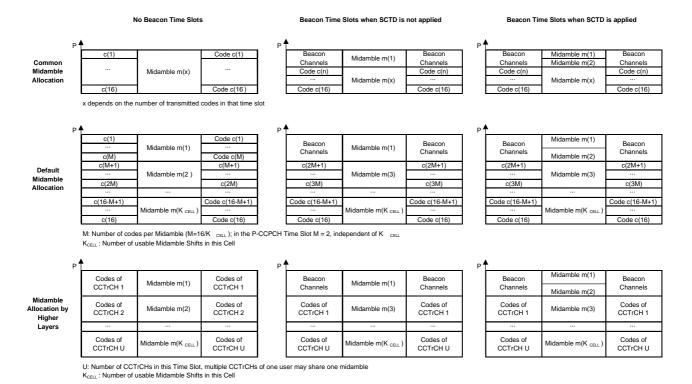


Figure 18: Midamble powers for the different midamble allocation schemes

5.8 Physical channels for the 3.84 Mcps MBSFN IMB option

Physical channels are defined by a specific carrier frequency, scrambling code, channelization code and in some cases a time start & stop (giving a duration). Scrambling and channelization codes are specified in [8]. Time durations are defined by start and stop instants, measured in integer multiples of chips. Suitable multiples of chips also used in specification are:

Radio frame: A radio frame is a processing duration which consists of 15 slots. The length of a radio

frame corresponds to 38400 chips (10 ms).

Slot: A slot is a duration which consists of fields containing bits. The length of a slot corresponds

to 2560 chips.

Sub-frame: A sub-frame corresponds to 3 slots (2 ms).

The default time duration for a physical channel is continuous from the instant when it is started to the instant when it is stopped. Physical channels that are not continuous will be explicitly described. In the case of 2 ms physical channel duration, the physical channel is active for only one 2 ms sub-frame (7680 chips) per radio frame. A physical channel of 2 ms duration may start at one of 5 start instances per radio frame. These correspond to 0 ms, 2 ms, 4 ms, 6 ms or 8 ms following the commencement of the radio frame and are denoted as sub-frames 0, 1, 2, 3 and 4 respectively.

Transport channels are described (in more abstract higher layer models of the physical layer) as being capable of being mapped to physical channels. Within the physical layer itself the exact mapping is from a composite coded transport channel (CCTrCH) to the data part of a physical channel. In addition to data parts there are also channel control parts and physical signals. For the IMB option, both a continuous and a discontinuous pilot physical channel shall be transmitted using specific OVSF channelisation codes.

The IMB option is only applicable for dedicated carrier MBSFN operations in which all TDD slots of the radio frame are configured in the downlink direction. All physical channels are common and downlink only.

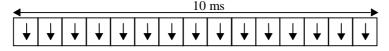


Figure 18iA: Downlink transmissions in all TDD slots

5.8.1 Transmit diversity

Transmit diversity is not applicable to IMB physical channels for MBSFN operations.

5.8.2 Common physical channels

The common physical channels used on a dedicated carrier for the IMB option are P-CPICH, T-CPICH, P-CCPCH, S-CCPCH frame type 1, S-CCPCH frame type 2, SCH and MICH.

5.8.2.1 Primary Common Pilot Channel (P-CPICH)

The primary common pilot channel (P-CPICH) is a fixed rate (30 kbps, SF=256) downlink physical channel using QPSK modulation and carrying a pre-defined bit sequence in which all bits are set to logical "0". The P-CPICH is transmitted continuously on all slots of the radio frame. Figure 18iiA shows the frame structure of the P-CPICH.

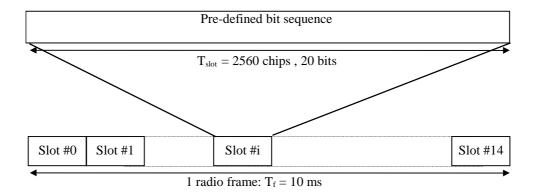


Figure 18iiA: Frame structure for Primary Common Pilot Channel

The P-CPICH has the following characteristics:

- The same channelization code is always used for the P-CPICH, see [8];
- The P-CPICH is scrambled by the primary scrambling code, see [8];
- There is one and only one P-CPICH per MBSFN cluster;
- The P-CPICH is broadcast over the entire MBSFN cluster.

5.8.2.2 Time-multiplexed Common Pilot Channel (T-CPICH)

The time-multiplexed common pilot channel (T-CPICH) is composed of a set of 15 SF=16 physical channels using 16-QAM modulation, each carrying a pre-defined pilot bit sequence of length 64 bits. All of the channelization codes used to carry T-CPICH are OVSF codes as defined in [8] and are orthogonal to the P-CPICH. The T-CPICH chip-level sequence has a length of 256 chips and is transmitted at the end of each slot of the radio frame. The T-CPICH is not transmitted during the first 2304 chips of each slot. The structure of the T-CPICH is shown in figure 18iiiA.

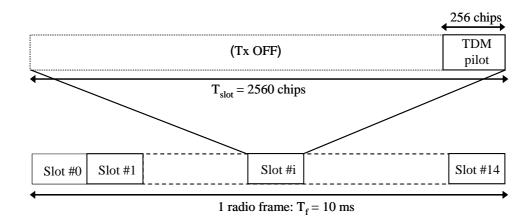


Figure 18iiiA: Structure of the Time-multiplexed Common Pilot Channel (T-CPICH)

The T-CPICH has the following characteristics:

- The T-CPICH is scrambled by the same scrambling code as P-CPICH
- There is one and only one T-CPICH per MBSFN cluster;
- The T-CPICH is broadcasted over the entire MBSFN cluster

The UE may use the T-CPICH as the phase reference for all downlink physical channels.

The pilot bit sequences carried on T-CPICH are defined as a function of the scrambling code index used for the MBSFN cluster and the slot index in which the T-CPICH is transmitted. With index n of the primary scrambling code as defined in [4] and with the index $i=0\ldots 14$, of the slot in which the T-CPICH is transmitted, the T-CPICH pilot bit sequences $B^{(n)}_{\text{T-CPICH},0}\ldots B^{(n)}_{\text{T-CPICH},959}$ are defined in table CD.1 of annex CD. For each slot index i, the bit sequences $B^{(n)}_{\text{T-CPICH},0}\ldots B^{(n)}_{\text{T-CPICH},959}$ are a concatenation of the 15 bit sequences $b^{(n)}_{\text{T-CPICH},0,m}\ldots b^{(n)}_{\text{T-CPICH},63,m}$ carried on each OVSF code $C_{\text{ch},16,m}$ (see [8]) with $m=1\ldots 15$ such that:

$$\left\{ \left. B^{(n)}_{\text{T-CPICH},0} , B^{(n)}_{\text{T-CPICH},1} , \ldots B^{(n)}_{\text{T-CPICH},959} \right. \right\} = \left\{ \left. \left\{ b^{(n)}_{\text{T-CPICH},0,1} , b^{(n)}_{\text{T-CPICH},1,1} \ldots b^{(n)}_{\text{T-CPICH},63,1} \right\}, \ldots \right. \\ \left. \left\{ b^{(n)}_{\text{T-CPICH},0,2} , b^{(n)}_{\text{T-CPICH},1,2} \ldots b^{(n)}_{\text{T-CPICH},63,2} \right\}, \ldots \\ \left. \ldots \left\{ b^{(n)}_{\text{T-CPICH},0,15} , b^{(n)}_{\text{T-CPICH},1,15} \ldots b^{(n)}_{\text{T-CPICH},63,15} \right\} \right\}$$

The OVSF code C_{ch.16.0} is not used by T-CPICH.

5.8.2.3 Primary common control physical channel (P-CCPCH)

The Primary CCPCH is a fixed rate (30 kbps, SF=256) downlink physical channels used to carry the BCH transport channel. The BCH transport channel has a fixed transport format combination, hence the Primary CCPCH does not support TFCI. The P-CCPCH uses QPSK modulation.

Figure 18ivA shows the frame structure of the P-CCPCH. The P-CCPCH is not transmitted during the first and last 256 chips of each slot. Instead, Primary SCH and Secondary SCH are transmitted during first DTX period and T-CPICH is transmitted during the last DTX period.

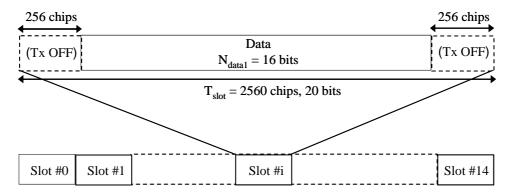


Figure 18ivA: Frame structure for Primary Common Control Physical Channel

5.8.2.4 Secondary common control physical channel (S-CCPCH)

The Secondary CCPCH is used to carry FACH transport channels.

For MBSFN IMB, there are two types of Secondary CCPCH:

- Secondary CCPCH frame type 1; consists of 15 slots per radio frame
- Secondary CCPCH frame type 2; consists of 3 slots (i.e. one sub-frame) per radio frame.

Both of the Secondary CCPCH frame types may include TFCI in order to support multiple transport format combinations. It is the UTRAN that determines if a TFCI should be transmitted, hence making it mandatory for all UEs to support the use of TFCI. The structures of the Secondary CCPCH frame type 1 and Secondary CCPCH frame type 2 are shown in figure 18vA and figure 18viA, respectively.

Physical channel bits of Secondary CCPCH frame type 1 slots are mapped to a QPSK signal point constellation whereas physical channel bits of Secondary CCPCH frame type 2 can be mapped either to QPSK or 16QAM signal point constellations. In the case of Secondary CCPCH frame type 2, the signal point constellation to be used for the data field is given by higher layer signalling.

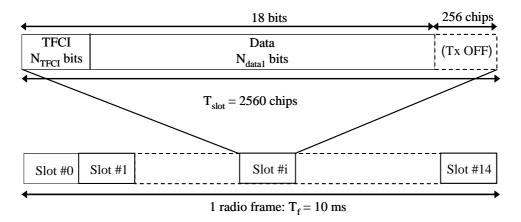


Figure 18vA: Frame structure for Secondary Common Control Physical Channel frame type 1

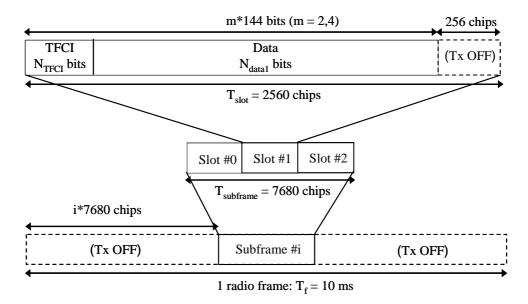


Figure 18viA: Frame structure for Secondary Common Control Physical Channel frame type 2

The parameter m in figure 18viA determines the total number of bits per Secondary CCPCH slot. The parameter m takes the value of 2 for QPSK modulation and 4 for 16-QAM modulation. The sub-frame index i in figure 18viA determines the start position of the sub-frame within the radio frame.

The values for the number of bits per field are given in table 8iA in which the channel bit and symbol rates are the rates immediately before spreading.

A FACH transport channel may be mapped to one Secondary CCPCH of frame type 1 or to one or more Secondary CCPCHs of frame type 2 that reside within the same sub-frame.

Slot Format #i	Channel Bit Rate (kbps)	Channel Symbol Rate (kbps)	SF	S-CCPCH frame type	Bits/ Frame	Bits/ Slot	N _{data1}	N _{TFCI}
0	30	15	256	1	270	18	18	0
1	30	15	256	1	270	18	16	2
2	480	240	16	2	864	288	288	0
3	480	240	16	2	864	288	272	16
4*	960	240	16	2	1728	576	576	0
5*	960	240	16	2	1728	576	560	16**

Table 8iA: Secondary CCPCH frame type 1 and 2 fields

For slot formats using TFCI, the TFCI value in each radio frame corresponds to a certain transport format combination of the FACHs currently in use. This correspondence is (re-)negotiated at each FACH addition/removal. The mapping of the TFCI bits onto slots for the IMB option is described in [7].

In the case of S-CCPCH frame type 1, when an S-CCPCH CCTrCH carries TFCI, the TFCI field shall be present on all slots of the radio frame. In this case there is only one S-CCPCH in the CCTrCH.

In the case of S-CCPCH frame type 2, when an S-CCPCH CCTrCH carries TFCI, the TFCI field shall be present on all slots of the sub-frame for the S-CCPCH with the lowest channelization code index in the CCTrCH. In this case, the TFCI field shall not be present on the other S-CCPCHs of the same CCTrCH.

^{*} Slot formats applicable to 16QAM.

^{**} This indicates that the number of modulation symbols occupied by TFCI is 4. As described in [7] and [8], QPSK modulation is applied to 8 TFCI bits per slot which results in the same number of 4 TFCI symbols

5.8.2.5 Synchronisation channel (SCH)

The Synchronisation Channel (SCH) is a downlink signal used for cell search and radio frame synchronisation on the MBSFN carrier. The SCH consists of two sub channels, the Primary and Secondary SCH. The 10 ms radio frames of the Primary and Secondary SCH are divided into 15 slots, each of length 2560 chips. Figure 18viiA illustrates the structure of the SCH radio frame.

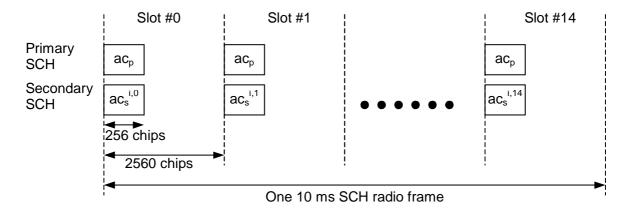


Figure 18viiA: Structure of Synchronisation Channel (SCH)

The Primary SCH consists of a modulated code of length 256 chips, the Primary Synchronisation Code (PSC) denoted c_p in figure 18viiA, transmitted once every slot. The PSC is the same for every cell in the system.

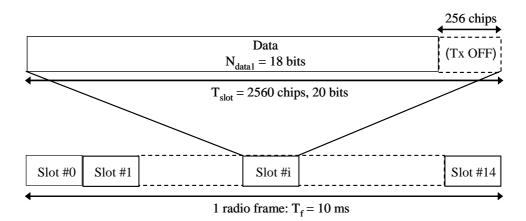
The Secondary SCH consists of repeatedly transmitting a length 15 sequence of modulated codes of length 256 chips, the Secondary Synchronisation Codes (SSC), transmitted in parallel with the Primary SCH. The SSC is denoted $c_s^{i,k}$ in figure 18viiA, where i = 0, 1, ..., 7 is the number of the scrambling code group, and k = 0, 1, ..., 14 is the slot number. Each SSC is chosen from a set of 16 different codes of length 256. This sequence on the Secondary SCH indicates which of the code groups the cell's downlink scrambling code belongs to.

The primary and secondary synchronization codes for the MBSFN IMB option, defined in [8], are modulated by the symbol a = -1.

5.8.2.6 The MBMS indicator channel (MICH)

The MBMS Indicator Channel (MICH) is a fixed rate (SF=256) physical channel used to carry the MBMS notification indicators. The MICH is always associated with an S-CCPCH frame type 1 to which a FACH transport channel carrying MBMS control data is mapped. MICH uses QPSK modulation.

Figure 18viiiA illustrates the frame structure of the MICH where the 10 ms radio frames of the MICH are divided into 15 slots, each of length 2560 chips. One MICH radio frame of length 10 ms consists of 270 bits $(b_0, b_1, ..., b_{269})$. Of these, 256 bits $(b_0, b_1, ..., b_{255})$ are used to carry notification indicators. The remaining 14 bits are not formally part of the MICH and shall not be transmitted (DTX). This implies that the transmitter is turned off during the last 2048 chips of slot #14 in every radio frame.



 $\{b_{2q}, b_{2q+1}\} = \{0, 0\}$

Nn=128

Figure 18viiiA: Frame structure for the MBMS Indicator Channel (MICH)

In each MICH frame, Nn notification indicators $\{N_0, ..., N_{Nn-1}\}$ are transmitted, where Nn=16, 32, 64, or 128.

The NI calculated by higher layers is associated to the index q of the notification indicator N_q , where q is computed as a function of the NI computed by higher layers, the SFN of the P-CCPCH radio frame during which the start of the MICH radio frame occurs, and the number of notification indicators per frame (Nn):

$$q = \left| \left(\left(C \times \left(\text{NI} \oplus \left(\left(C \times SFN \right) \mod G \right) \right) \right) \mod G \right) \times \frac{Nn}{G} \right|$$

where $G = 2^{16}$, C = 25033 and NI is the 16 bit Notification Indicator calculated by higher layers.

The set of NI signalled over Iub indicates all higher layer NI values for which the associated notification indicator on MICH shall be set to 1 during the corresponding modification period. Hence, the calculation in the formula above shall be performed in the Node B every MICH frame for each NI signalled over Iub to make the association between NI and q and set the related N_q to 1. All other notification indicators on MICH shall be set to 0.

The mapping from $\{N_0, ..., N_{Nn-1}\}$ to the MICH bits $\{b_0, ..., b_{255}\}$ are according to table 8iiA.

 $\{b_{2q}, b_{2q+1}\} = \{1, 1\}$

Table 8iiA: Mapping of notification indicators N_q to MICH bits

5.8.3 Timing relationship between physical channels

Timing between the common physical channels is summarized in figure 18ixA. The P-CCPCH, on which the cell SFN is transmitted, is used as timing reference for all the physical channels. The SCH, P-CPICH, T-CPICH, P-CCPCH and S-CCPCH frame types 1 and 2 have identical radio frame timings. The sub-frame number i of an S-CCPCH frame type 2 radio frame is signalled by higher layers. The start position of an S-CCPCH frame type 2 sub-frame is then given by $i \cdot 7680$, (i = 0,1,2,3,4), chips after the start of the radio frame.

The frame timing of MICH is advanced by $\tau_{\text{MICH}} = 3$ slots (7680 chips) with respect to the timings of the other physical channels.

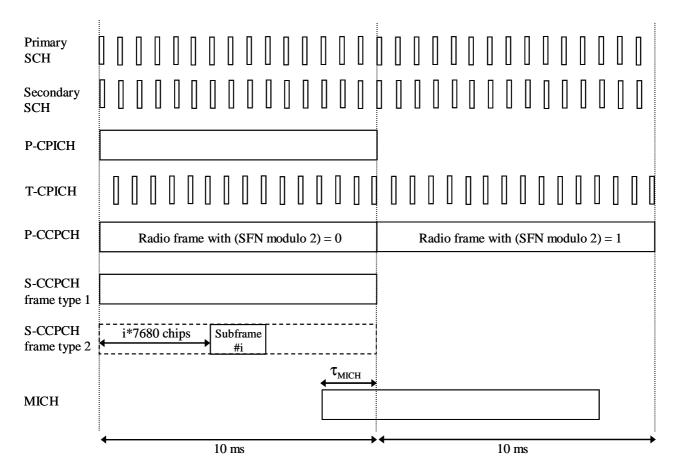


Figure 18ixA: Radio frame and sub-frame timing of downlink physical channels

5A Physical channels for the 1.28 Mcps option

All physical channels take three-layer structure with respect to timeslots, radio frames and system frame numbering (SFN), see [14]. Depending on the resource allocation, the configuration of radio frames or timeslots becomes different. All physical channels need guard symbols in every timeslot. The time slots are used in the sense of a TDMA component to separate different user signals in the time and the code domain. The physical channel signal format for 1.28Mcps TDD is presented in figure 18A.

A physical channel in TDD is a burst, which is transmitted in a particular timeslot within allocated Radio Frames. The allocation can be continuous, i.e. the time slot in every frame is allocated to the physical channel or discontinuous, i.e. the time slot in a subset of all frames is allocated only. A burst is the combination of a data part, a midamble and a guard period or only a midamble for standalone midamble channel. The duration of a burst is one time slot. Note when in the entire carrier dedicated to MBSFN operation, a burst is the combination of a preamble and a data part. Several bursts can be transmitted at the same time from one transmitter. In this case, the data part must use different OVSF channelisation codes, but the same scrambling code. The midamble part has to use the same basic midamble code, but can use different midambles. In a multi-frequency cell the midamble parts in different carrier shall also have to use the same basic midamble code, but can use different midambles. Note when in MBSFN operation, a midamble or preamble is not necessarily cell-specific.

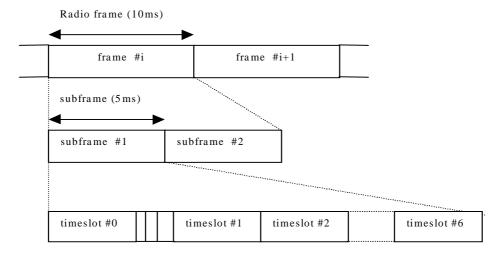


Figure 18A: Physical channel signal format for 1.28Mcps TDD option

The data part of the burst is spread with a combination of channelisation code and scrambling code. The channelisation code is a OVSF code, that can have a spreading factor of 1, 2, 4, 8, or 16. The data rate of the physical channel is depending on the used spreading factor of the used OVSF code.

So a physical channel is defined by frequency, timeslot, channelisation code, burst type and Radio Frame allocation. The scrambling code and the basic midamble code or preamble code are broadcast and may be constant within a cell. When a physical channel is established, a start frame is given. The physical channels can either be of infinite duration, or a duration for the allocation can be defined.

5A.1 Frame structure

The TDMA frame has duration of 10 ms and is divided into 2 sub-frames of 5ms. The frame structure for each sub-frame in the 10ms frame length is the same.

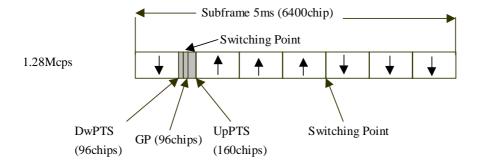


Figure 18B: Structure of the sub-frame for 1.28Mcps TDD option

Time slot#n (n from 0 to 6): the nth traffic time slot, 864 chips duration;

DwPTS: downlink pilot time slot, 96 chips duration;

UpPTS: uplink pilot time slot, 160 chips duration;

GP: main guard period for TDD operation, 96 chips duration;

In Figure 18B, the total number of traffic time slots for uplink and downlink is 7, and the length for each traffic time slot is 864 chips duration. Among the 7 traffic time slots, time slot#0 is always allocated as downlink while time slot#1 is always allocated as uplink. The time slots for the uplink and the downlink are separated by switching points. Between the downlink time slots and uplink time slots, the special period is the switching point to separate the uplink and

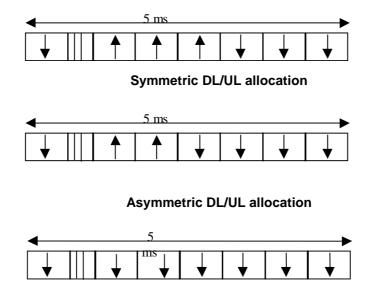
downlink. In each sub-frame of 5ms for 1.28Mcps option, there are two switching points (uplink to downlink and vice versa).

Using the above frame structure, the 1.28Mcps TDD option can operate on both symmetric and asymmetric mode by properly configuring the number of downlink and uplink time slots. In any configuration at least one time slot (time slot#0) has to be allocated for the downlink and at least one time slot has to be allocated for the uplink (time slot#1).

In case of entire carrier dedicated to MBSFN, no uplink timeslot is used, and DwPTS, UpPTS and GP(96 chips duration) are combined into one short timeslot, the duration of which is 0.275ms.

In a multi-frequency cell the traffic time slots allocated for uplink and downlink pair(s) for one UE should be on the same carrier.

Examples for symmetric and asymmetric UL/DL allocations are given in figure 18C.



Entire carrier dedicated to MBSFN

Figure 18C: 1.28Mcps TDD sub-frame structure examples

Note 1: In a multi-frequency cell, it is suggested the switching point configuration on secondary frequencies to be the same as that on primary frequency.

5A.2 Dedicated physical channel (DPCH)

The DCH as described in subclause 4.1.1 'Dedicated transport channels' is mapped onto the dedicated physical channel.

5A.2.1 Spreading

The spreading of physical channels is the same as in 3.84 Mcps TDD (cf. 5.2.1 'Spreading'). When there are more than two uplink physical channels to be transmitted in one timeslot, UE shall always guarantee the transmission of DPCH with data to be transmitted and non-scheduled E-PUCH.

5A.2.2 Burst Format

A traffic burst consists of two data symbol fields, a midamble of 144 chips and a guard period. The data fields of the burst are 352 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 8A below. The guard period is 16 chip periods long.

The burst format is shown in Figure 18D. The contents of the traffic burst fields is described in table 8B.

Table 8A: number of symbols per data field in a traffic burst

Spreading factor (Q)	Number of symbols (N) per data field in Burst
1	352
2	176
4	88
8	44
16	22

Table 8B: The contents of the traffic burst format fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-351	352	cf table 8A	Data symbols
352-495	144	-	Midamble
496-847	352	cf table 8A	Data symbols
848-863	16	-	Guard period

Data symbols 352 chips	Midamble 144 chips	Data symbols 352 chips	GP 16 CP
4	864*T _c	,	

Figure 18D: Burst structure of the traffic burst format (GP denotes the guard period and CP the chip periods)

5A.2.2a Dedicated carrier MBSFN Burst Format

In this case, there are two bursts, one is MBSFN Traffic burst (MT burst) for 7 normal timeslots, and the other is MBSFN Special burst (MS burst) for 1 short timeslot. Both of them consist of a preamble and a data symbol field, the lengths of which are different for the individual bursts. Thus, the number of data symbols in a burst depends on the SF and the burst type, as depicted in table 8A.a.

Table 8A.a: number of symbols per data field in a MBSFN burst

Spreading factor (Q)	Number of symbos (N) per data field in Burst		
	MT Burst	MS Burst	
1	768	N/A	
2	384	N/A	
16	48	16	

Note: MS burst only supports SF=16.

The support of both bursts is mandatory and only used in dedicated carrier MBSFN. The both different bursts defined here are well suited for this application, as described in the following paragraphs.

The MT burst can be used for the regular timeslots, the duration of which is 0.675ms. The data fields of the MT burst are 768 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 8A.a above. The preamble of MT burst has a length of 96 chips. The MT burst is shown in Figure 18D.a. The contents of the burst fields are described in table 8B.a.

Table 8B.a: The contents of the MT burst

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-95	96	-	Preamble
96-863	768	cf table 8A.a	Data symbols

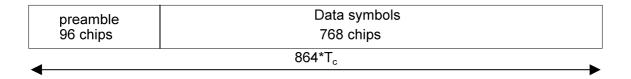


Figure 18D.a: Burst structure of the MT burst

The MS burst can be used for the short timeslot, the duration of which is 0.275ms. The data fields of the MS burst are 256 chips long. The corresponding number of symbols is 16, as indicated in table 8A.a above. The preamble of the MS burst has a length of 96 chips. The MS burst format is shown in Figure 18D.b. The contents of the burst fields are described in table 8B.b.

Table 8B.b: The contents of the MS burst

Chip number (CN) Length of field in chips		Length of field in symbols	Contents of field	
0-95	96	-	Preamble	
96-351	256	cf table 8A.a	Data symbols	

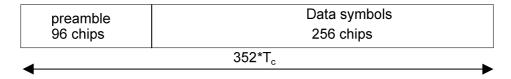


Figure 18D.b: Burst structure of the MS burst

5A.2.2.1 Transmission of TFCI

The traffic burst format provides the possibility for transmission of TFCI in uplink and downlink.

The transmission of TFCI is configured by higher Layers. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied. Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with the lowest physical channel sequence number (*p*) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

The transmission of TFCI is done in the data parts of the respective physical channel, this means that TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. Hence the midamble structure and length is not changed.

The TFCI code word bits are equally distributed between the two subframes and the respective data fields. The TFCI code word is to be transmitted possibly either directly adjacent to the midamble or after the SS and TPC symbols. Figure 18E shows the position of the TFCI code word in a traffic burst, if neither SS nor TPC are transmitted. Figure 18F shows the position of the TFCI code word in a traffic burst , if SS and TPC are transmitted.

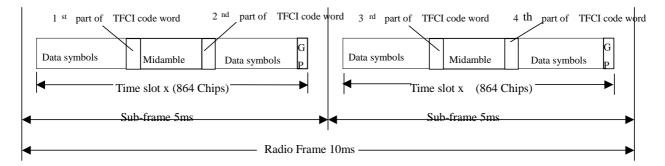


Figure 18E: Position of the TFCI code word in the traffic burst in case of no TPC and SS in 1.28 Mcps
TDD

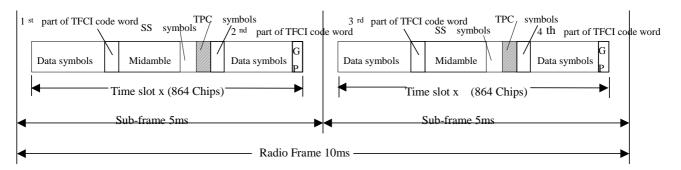


Figure 18F: Position of the TFCI code word in the traffic burst in case of TPC and SS in 1.28 Mcps
TDD

5A.2.2.1a Transmission of TFCI for MT burst and MS burst

Both MT burst and MS burst provide the possibility for transmission of TFCI in downlink. The procedure of transmitting TFCI is the same as 5A.2.2.

The transmission of TFCI is done in the data parts of the respective physical channel, this means that TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. Hence the preamble structure and length is not changed.

The TFCI code word bits are equally distributed among the four subframes and the respective data fields. The TFCI code word is to be transmitted directly at the beginning and at the end of data symbols. Figure 18E.a shows the position of the TFCI code word in the MT burst. Figure 18E.b shows the position of the TFCI code word in the MS burst.

Note: when the modulation is 16QAM the number of the TFCI bits need be expanded. The procedure of expansion is detailed described in [7]

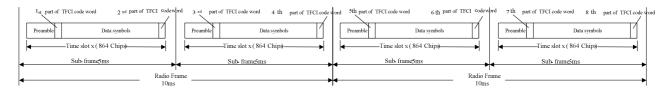


Figure 18E.a: Position of the TFCI code word in the MT burst format in 1.28 Mcps TDD

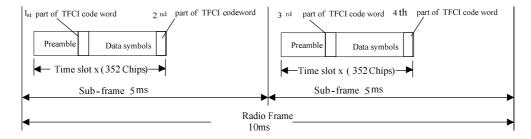


Figure 18E.b: Position of the TFCI code word in the MS burst format in 1.28 Mcps TDD

5A.2.2.2 Transmission of TPC

In this section, transmission of TPC over dedicated physical channels is described. Optionally, UTRAN may configure some UL CCTrCH's to be controlled via TPC commands on PLCCH (for example in the case of HS-DSCH operation without an associated downlink DPCH). PLCCH is described in section 5A.3.13.

Within the context of this subclause, only those TPC commands not borne by PLCCH (in the DL case) nor by PLCCH-controlled physical channels (in the UL case) are considered. That is to say that those UL timeslot/CCTrCH pairs controlled by PLCCH and those DL TPC commands mapped to PLCCH are excluded from consideration when deriving the mapping between UL/DL TPC commands and the UL/DL CCTrCH's they control. The association between PLCCH and UL timeslot/CCTrCH pair(s) is signalled by higher layers.

The burst type for dedicated channels provides the possibility for transmission of TPC in uplink and downlink.

The transmission of TPC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the SS information, which is transmitted after the midamble. Figure 18G shows the position of the TPC command in a traffic burst.

For every user the TPC information is to be transmitted at least once per 5ms sub-frame. For each allocated timeslot it is signalled individually whether that timeslot carries TPC information or not. If applied in a timeslot, transmission of TPC symbols is done in the data parts of the traffic burst and they are transmitted using the physical channel with the lowest physical channel sequence number (*p*) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

TPC symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{TPC} physical channels, individually for each time slot. The TPC symbols shall then be transmitted using the physical channels with the $N_{TPC}+1$ lowest physical channel sequence numbers (p) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{TPC}+1$ remaining physical channels in this time slot, TPC symbols shall be transmitted only on the N_{RM} remaining physical channels.

The TPC symbols are spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

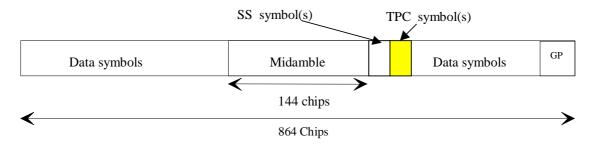


Figure 18G: Position of TPC information in the traffic burst in downlink and uplink

For the number of TPC symbols per time slot there are 3 possibilities, that can be configured by higher layers, individually for each timeslot:

1) one TPC symbol

- 2) no TPC symbols
- 3) 16/SF TPC symbols

So, in case 3), when SF=1, there are 16 TPC symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

In the following the uplink is described only. For the description of the downlink, downlink (DL) and uplink (UL) have to be interchanged.

Each of the TPC symbols for uplink power control in the DL will be associated with an UL time slot and an UL CCTrCH pair. This association varies with

- the number of allocated UL time slots and UL CCTrCHs on these time slots (time slot and CCTrCH pair) and
- the allocated TPC symbols in the DL.

In case a UE has

more than one channelisation code

and/or

- channelisation codes being of lower spreading factor than 16 and using 16/SF SS and 16/SF TPC symbols,

the TPC commands for each ULtime slot CCTrCH pair (all channelisation codes on that time slot belonging to the same time slot and CCTrCH pair have the same TPC command) will be distributed to the following rules:

- 1. The ULtime slots and CCTrCH pairs the TPC commands are intended for will be numbered from the first to the last ULtime slot and CCTrCH pair allocated to the regarded UE (starting with 0). The number of a time slot and CCTrCH pair is smaller than the number of another time slot and CCTrCH pair within the same time slot if its spreading code with the lowest SC number according to the following table has a lower SC number than the spreading code with the lowest SC number of the other time slot and CCTrCH pair.
- 2. The commanding TPC symbols on all DL CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:
 - a) The numbers of the TPC commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot
 - b) Within a DL time slot the numbers of the TPC commands of a regarded channelisation code are lower than those of channelisation codes having a higher spreading code number

The spreading code number is defined by the following table (see[8]):

SC number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{\mathcal{Q}=16}^{(k=1)}$
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
16	8	$\mathbf{c}_{Q=8}^{(k=1)}$
23	8	$\mathbf{c}_{Q=8}^{(k=8)}$
24	4	$\mathbf{c}_{Q=4}^{(k=1)}$
27	4	$\mathbf{c}_{Q=4}^{(k=4)}$
28	2	$\mathbf{c}_{Q=2}^{(k=1)}$
29	2	$\mathbf{c}_{Q=2}^{(k=2)}$
30	1	$\mathbf{c}_{\mathcal{Q}=1}^{(k=1)}$

Note: Spreading factors 2-8 are not used in DL

c) Within a channelisation code numbers of the TPC commands are lower than those of TPC commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded TPC symbol in the DL:

$$UL_{pos} = \left(SFN' \cdot N_{UL_TPCsymbols} + TPC_{DLpos} + \left(\left(SFN' \cdot N_{UL_TPCsymbols} + TPC_{DLpos}\right) \operatorname{div}(N_{ULslot})\right)\right) \operatorname{mod}(N_{ULslot}),$$

where

UL_{pos} is the number of the controlled uplink time slot and CCTrCH pairs.

SFN' is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN' by

SFN=SFN' div 2, where div is the remainder free division operation.

 $N_{UL_PC symbols}$ is the number of UL TPC symbols in a sub-frame (excluding those on PLCCH-controlled resources).

TPC_{DLpos} is the number of the regarded UL TPC symbol in the DL within the sub-frame.

N_{ULslot} is the number of UL slots and CCTrCH pairs in a sub-frame (excluding those associated with PLCCH).

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between TPC symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

In Annex CB two examples of the association of TPC commands to time slots and CCTrCH pairs are shown.

Coding of TPC:

The relationship between the TPC Bits and the transmitter power control command for QPSK is the same as in the 3.84Mcps TDD cf. [5.2.2.5 'Transmission of TPC'].

The relationship between the TPC Bits and the transmitter power control command for 8PSK is given in table 8C

Table 8C: TPC Bit Pattern for 8PSK

TPC Bits	TPC command	Meaning
000	'Down'	Decrease Tx Power
110	'Up'	Increase Tx Power

5A.2.2.3 Transmission of SS

In this section, transmission of SS over dedicated physical channels is described. Optionally, UTRAN may configure some UL CCTrCH's to be controlled via SS commands on PLCCH (for example in the case of HS-DSCH operation without an associated downlink DPCH). PLCCH is described in section 5A.3.13.

Within the context of this subclause, only those SS commands not borne by PLCCH are considered. That is to say that those UL timeslots controlled exclusively by PLCCH and those SS commands carried by PLCCH are excluded from consideration when deriving the mapping between DL SS commands and the UL timeslots they control. The association between PLCCH and UL timeslot/CCTrCH pair(s) is signalled by higher layers.

The burst type for dedicated channels provides the possibility for transmission of uplink synchronisation control (ULSC).

The transmission of ULSC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The ULSC information is to be transmitted directly after the midamble. Figure 18H shows the position of the SS command in a traffic burst.

For every user the ULSC information shall be transmitted at least once per transmitted sub-frame.

For each allocated timeslot it is signalled individually whether that timeslot carries ULSC information or not. If applied in a time slot, transmission of SS symbols is done in the data parts of the traffic burst and they are transmitted using the physical channel with the lowest physical channel sequence number (*p*) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

SS symbols may also be transmitted on more than one physical channel in a time slot. For this purpose, higher layers allocate an additional number of N_{SS} physical channels, individually for each time slot. The SS symbols shall then be transmitted using the physical channels with the $N_{SS}+1$ lowest physical channel sequence numbers (p) in that time slot. Physical channel sequence numbering is determined by the rate matching function and is described in [7]. If the rate matching function results in $N_{RM} < N_{SS}+1$ remaining physical channels in this time slot, SS symbols shall be transmitted only on the N_{RM} remaining physical channels.

The SS symbols are spread with the same spreading factor (SF) and spreading code as the data parts of the respective physical channel.

The SS is utilised to command a timing adjustment by (k/8) Tc each M sub-frames, where Tc is the chip period. The k and M values are signalled by the network. The SS, as one of L1 signals, is to be transmitted once per 5ms sub-frame.

M (1-8) and k (1-8) can be adjusted during call setup or readjusted during the call.

Note: The smallest step for the SS signalled by the UTRAN is 1/8 Tc. For the UE capabilities regarding the SS adjustment of the UE it is suggested to set the tolerance for the executed command to be [1/9;1/7] Tc.

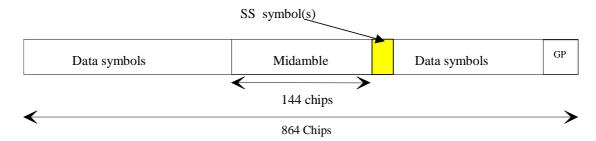


Figure 18H: Position of ULSC information in the traffic burst (downlink and uplink)

Note that for the uplink where there is no SS symbol used, the SS symbol space is reserved for future use. This can keep UL and DL slots the same structure.

For the number of SS symbols per time slot there are 3 possibilities, that cn be configured by higher layers individually for each time slot:

- one SS symbol
- no SS symbol
- 16/SF SS symbols

So, in case 3, when SF=1, there are 16 SS symbols which correspond to 32 bits (for QPSK) and 48 bits (for 8PSK).

Each of the SS symbols in the DL will be associated with an UL time slot depending on the allocated UL time slots and the allocated SS symbols in the DL.

Note: Even though the different time slots of the UE are controlled with independent SS commands, the UE is not in need to execute SS commands leading to a deviation of more than [3] chip with respect to the average timing advance applied by the UE.

The synchronisation shift commands for each UL time slot (all channelisation codes on that time slot have the same SS command) will be distributed to the following rules:

- 1. The UL time slots the SS commands are intended for will be numbered from the first to the last UL time slot occupied by the regarded UE (starting with 0) considering all CCTrCHs allocated to that UE.
- 2. The commanding SS symbols on all downlink CCTrCHs allocated to one UE are numbered consecutively starting with zero according to the following rules:
 - a) The numbers of the SS commands of a regarded DL time slot are lower than those of DL time slots being transmitted after that time slot
 - b) Within a DL time slot the numbers of the SS commands of a regarded channelisation code are lower than those of channelisation codes having a bigger spreading code number

The spreading code number is defined by the following table: (see TS 25.223)

Spreading code number	SF (Q)	Walsh code number (k)
0	16	$\mathbf{c}_{Q=16}^{(k=1)}$
15	16	$\mathbf{c}_{Q=16}^{(k=16)}$
	Spreading factors 2-8	
	are nor used in DL	
30	1	$\mathbf{c}_{Q=1}^{(k=1)}$

 Within a channelisation code numbers of the SS commands are lower than those of SS commands being transmitted after that time

The following equation is used to determine the UL time slot which is controlled by the regarded SS symbol:

$$UL_{pos} = \left(SFN' \cdot N_{SSsymbols} + SS_{pos} + \left(\left(SFN' \cdot N_{SSsymbols} + SS_{pos}\right) \operatorname{div}(N_{ULslot})\right)\right) \operatorname{mod}(N_{ULslot}),$$

where

UL_{pos} is the number of the controlled uplink time slot.

SFN' is the system frame number counting the sub-frames. The system frame number of the radio frames (SFN) can be derived from SFN' by

SFN=SFN' div 2, where div is the remainder free division operation.

N_{SSsymbols} is the number of SS symbols in a sub-frame (excluding those associated with PLCCH).

SS_{pos} is the number of the regarded SS symbol within the sub-frame.

N_{ULslot} is the number of UL slots in a sub-frame (excluding those slots exclusively controlled by PLCCH).

When one of the above parameters is changed due to higher layer reconfiguration, the new relationship between SS symbols and controlled UL time slots shall be valid, beginning with the radio frame, for which the new parameters are set.

The relationship between the SS Bits and the SS command for QPSK is the given in table 8D:

Table 8D: Coding of the SS for QPSK

SS Bits	SS command	Meaning
00	'Down'	Decrease synchronisation shift by k/8 Tc
11	'Up'	Increase synchronisation shift by k/8 Tc
01	'Do nothing'	No change

The relationship between the SS Bits and the SS command for 8PSK is given in table 8E:

Table 8E: Coding of the SS for 8PSK

SS Bits	SS command	Meaning
000	'Down'	Decrease synchronisation shift by k/8 Tc
110	'Up'	Increase synchronisation shift by k/8 Tc
011	'Do nothing'	No change

5A.2.2.4 Timeslot formats

The timeslot format depends on the spreading factor, the number of the TFCI code word bits, the number of SS and TPC symbols and the applied modulation scheme (QPSK/8PSK) as depicted in the following tables.

5A.2.2.4.1 Timeslot formats for QPSK

5A.2.2.4.1.1 Downlink timeslot formats

Table 8F: Time slot formats for the Downlink

Slot Format #	Spreading Factor	Midamble length (chips)	N _{TFCI} code word (bits)	N _{SS} & N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0	16	144	0	0 & 0	88	88	44	44
1	16	144	4	0 & 0	88	86	42	44
2	16	144	8	0 & 0	88	84	42	42
3	16	144	16	0 & 0	88	80	40	40
4	16	144	32	0 & 0	88	72	36	36
5	16	144	0	2 & 2	88	84	44	40
6	16	144	4	2 & 2	88	82	42	40
7	16	144	8	2 & 2	88	80	42	38
8	16	144	16	2 & 2	88	76	40	36
9	16	144	32	2 & 2	88	68	36	32
10	1	144	0	0 & 0	1408	1408	704	704
11	1	144	4	0 & 0	1408	1406	702	704
12	1	144	8	0 & 0	1408	1404	702	702
13	1	144	16	0 & 0	1408	1400	700	700
14	1	144	32	0 & 0	1408	1392	696	696
15	1	144	0	2 & 2	1408	1404	704	700
16	1	144	4	2 & 2	1408	1402	702	700
17	1	144	8	2 & 2	1408	1400	702	698
18	1	144	16	2 & 2	1408	1396	700	696
19	1	144	32	2 & 2	1408	1388	696	692
20	1	144	0	32 & 32	1408	1344	704	640
21	1	144	4	32 & 32	1408	1342	702	640
22	1	144	8	32 & 32	1408	1340	702	638
23	1	144	16	32 & 32	1408	1336	700	636
24	1	144	32	32 & 32	1408	1328	696	632

5A.2.2.4.1.2 Uplink timeslot formats

Table 8G : Time slot formats for the Uplink

Slot	Spreading	Midamble	N _{TFCI}	N _{SS} & N _{TPC}	Bits/slot	N _{Data/Slot}	N _{data/data}	N _{data/data}
Format	Factor	length	code word	(bits)	2110,0101	(bits)	field(1)	field(2)
#		(chips)	(bits)	, ,		, ,	(bits)	(bits)
0	16	144	0	0 & 0	88	88	44	44
1	16	144	4	0 & 0	88	86	42	44
2	16	144	8	0 & 0	88	84	42	42
3	16	144	16	0 & 0	88	80	40	40
4	16	144	32	0 & 0	88	72	36	36
5	16	144	0	2 & 2	88	84	44	40
6	16	144	4	2 & 2	88	82	42	40
7	16	144	8	2 & 2	88	80	42	38
8	16	144	16	2 & 2	88	76	40	36
9	16	144	32	2 & 2	88	68	36	32
10	8	144	0	0 & 0	176	176	88	88
11	8	144	4	0 & 0	176	174	86	88
12	8	144	8	0 & 0	176	172	86	86
13	8	144	16	0 & 0	176	168	84	84
14	8	144	32	0 & 0	176	160	80	80
15	8	144	0	2 & 2	176	172	88	84
16	8	144	4	2 & 2	176	170	86	84
17	8	144	8	2 & 2	176	168	86	82
18	8	144	16	2 & 2	176	164	84	80
19	8	144	32	2 & 2	176	156	80	76
20	8	144	0	4 & 4	176	168	88	80
21	8	144	4	4 & 4	176	166	86	80
22	8	144	8	4 & 4	176	164	86	78
23	8	144	16	4 & 4	176	160	84	76
24	8	144	32	4 & 4	176	152	80	72
25	4	144	0	0 & 0	352	352	176	176
26	4	144	4	0 & 0	352	350	174	176
27	4	144	8	0 & 0	352	348	174	174
28	4	144	16	0 & 0	352	344	172	172
29	4	144	32	0 & 0	352	336	168	168
30	4	144	0	2 & 2	352	348	176	172
31	4	144	4	2 & 2	352	346	174	172
32	4	144	8	2 & 2	352	344	174	170
33	4	144	16	2 & 2	352	340	172	168
34	4	144	32	2 & 2	352	332	168	164
35	4	144	0	8 & 8	352	336	176	160
36	4	144	4	8 & 8	352	334	174	160
37	4	144	8	8 & 8	352	332	174	158
38	4	144	16	8 & 8	352	328	172	156
39	4	144	32	8 & 8	352	320	168	152
40	2	144	0	0 & 0	704	704	352	352
41	2	144	4	0 & 0	704	702	350	352
42	2	144	8	0 & 0	704	700	350	350
43	2	144	16	0 & 0	704	696	348	348
44	2	144	32	0 & 0	704	688	344	344
45	2	144	0	2 & 2	704	700	352	348
46	2	144	4	2 & 2	704	698	350	348

Slot Format #	Spreading Factor	Midamble length (chips)	N _{TFCI} code word (bits)	N _{SS} & N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
47	2	144	8	2 & 2	704	696	350	346
48	2	144	16	2 & 2	704	692	348	344
49	2	144	32	2 & 2	704	684	344	340
50	2	144	0	16 & 16	704	672	352	320
51	2	144	4	16 & 16	704	670	350	320
52	2	144	8	16 & 16	704	668	350	318
53	2	144	16	16 & 16	704	664	348	316
54	2	144	32	16 & 16	704	656	344	312
55	1	144	0	0 & 0	1408	1408	704	704
56	1	144	4	0 & 0	1408	1406	702	704
57	1	144	8	0 & 0	1408	1404	702	702
58	1	144	16	0 & 0	1408	1400	700	700
59	1	144	32	0 & 0	1408	1392	696	696
60	1	144	0	2 & 2	1408	1404	704	700
61	1	144	4	2 & 2	1408	1402	702	700
62	1	144	8	2 & 2	1408	1400	702	698
63	1	144	16	2 & 2	1408	1396	700	696
64	1	144	32	2 & 2	1408	1388	696	692
65	1	144	0	32 & 32	1408	1344	704	640
66	1	144	4	32 & 32	1408	1342	702	640
67	1	144	8	32 & 32	1408	1340	702	638
68	1	144	16	32 & 32	1408	1336	700	636
69	1	144	32	32 & 32	1408	1328	696	632

5A.2.2.4.2 Time slot formats for 8PSK

The Downlink and the Uplink timeslot formats are described together in the following table.

Table 8H: Timeslot formats for 8PSK modulation

Slot Format #	Spreading Factor	Midamble length (chips)	N _{TFCI} code word (bits)	N _{SS} & N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0	1	144	0	0 & 0	2112	2112	1056	1056
1	1	144	6	0 & 0	2112	2109	1053	1056
2	1	144	12	0 & 0	2112	2106	1053	1053
3	1	144	24	0 & 0	2112	2100	1050	1050
4	1	144	48	0 & 0	2112	2088	1044	1044
5	1	144	0	3 & 3	2112	2106	1056	1050
6	1	144	6	3 & 3	2112	2103	1053	1050
7	1	144	12	3 & 3	2112	2100	1053	1047
8	1	144	24	3 & 3	2112	2094	1050	1044
9	1	144	48	3 & 3	2112	2082	1044	1038
10	1	144	0	48 & 48	2112	2016	1056	960
11	1	144	6	48 & 48	2112	2013	1053	960
12	1	144	12	48 & 48	2112	2010	1053	957
13	1	144	24	48 & 48	2112	2004	1050	954
14	1	144	48	48 & 48	2112	1992	1044	948
15	16	144	0	0 & 0	132	132	66	66
16	16	144	6	0 & 0	132	129	63	66
17	16	144	12	0 & 0	132	126	63	63
18	16	144	24	0 & 0	132	120	60	60
19	16	144	48	0 & 0	132	108	54	54
20	16	144	0	3 & 3	132	126	66	60
21	16	144	6	3 & 3	132	123	63	60
22	16	144	12	3 & 3	132	120	63	57
23	16	144	24	3 & 3	132	114	60	54
24	16	144	48	3 & 3	132	102	54	48

5A.2.2.4.3 Time slot formats for MBSFN

Downlink timeslot formats using QPSK or 16QAM modulation is dedicated for MBSFN operation and is described in the following table.

Table 8Ha: Time slot formats for MBSFN

Slot Format #	Spreading Factor	Midamble /preamble length (chips)	N _{TFCI} code word (bits)	N _{SS} & N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0(QPSK) *	1	144	16	0 & 0	1408	1404	702	702
1(QPSK) *	16	144	16	0 & 0	88	84	42	42
2(16QA M) *	1	144	32	0 & 0	2816	2808	1404	1404
3(16QA M)*	16	144	32	0 & 0	176	168	84	84
4(QPSK)**	1	96	16	0 & 0	1536	1532	N/A	N/A
5(QPSK) **	2	96	16	0 & 0	768	764	N/A	N/A
6(QPSK)**	16	96	16	0 & 0	96	92	N/A	N/A
7(16QA M)**	1	96	32	0 & 0	3072	3064	N/A	N/A
8(16QA M) **	2	96	16	0 & 0	1536	1528	N/A	N/A
9(16QA M)**	16	96	32	0 & 0	192	184	N/A	N/A
10(QPS K)***	16	96	16	0 & 0	32	24	N/A	N/A
11(QPS K)***	16	96	0	0 & 0	32	32	N/A	N/A

NOTE: * denotes that these timeslot formats are used in the traffic burst for mixed carrier MBSFN. ** denotes that these timeslot formats are used in the MT burst for dedicated carrier MBSFN. *** denotes that these timeslot formats are used in the MS burst for dedicated carrier MBSFN. The burst in the dedicated carrier MBSFN has only one date field.

5A.2.3 Training sequences for spread bursts

In this subclause, the training sequences for usage as midambles are defined. The training sequences, i.e. midambles, of different users active in the same cell and same time slot are cyclically shifted versions of one single basic midamble code. In the case of MBSFN timeslots there is only a single midamble and this is derived from a single basic midamble code which is not necessarily cell-specific. The applicable basic midamble codes are given in Annex AA.1.

The basic midamble codes in Annex AA.1 are listed in hexadecimal notation. The binary form of the basic midamble code shall be derived according to table 8I below.

Mapped on hexadecimal digit 4 binary elements m_i -1 -1 -1 -1 2 3 4 5 6 7 8 9 В С D Е 1 1-1

Table 8I: Mapping of 4 binary elements m_i on a single hexadecimal digit:

For each particular basic midamble code, its binary representation can be written as a vector \mathbf{m}_{p} :

$$\mathbf{m}_{\mathbf{p}} = \left(m_1, m_2, ..., m_p\right) \tag{1}$$

According to Annex AA.1, the size of this vector $\mathbf{m}_{\rm P}$ is P=128. As QPSK modulation is used, the training sequences are transformed into a complex form, denoted as the complex vector $\mathbf{m}_{\rm P}$:

$$\underline{\mathbf{m}}_{P} = \left(\underline{m}_{1}, \underline{m}_{2}, \dots, \underline{m}_{P}\right) \tag{2}$$

The elements \underline{m}_i of $\underline{\mathbf{m}}_P$ are derived from elements m_i of \mathbf{m}_P using equation (3):

$$\underline{m}_{i} = (\mathbf{j})^{i} \cdot m_{i} \text{ for all } i = 1, ..., P$$
(3)

Hence, the elements \underline{m}_i of the complex basic midamble code are alternating real and imaginary.

To derive the required training sequences, this vector $\mathbf{m}_{\rm p}$ is periodically extended to the size:

$$i_{\text{max}} = L_m + (K - 1)W \tag{4}$$

Notes on equation (4):

K and W are taken from Annex AA.1

So we obtain a new vector $\underline{\mathbf{m}}$ containing the periodic basic midamble sequence:

$$\underline{\mathbf{m}} = \left(\underline{m}_1, \underline{m}_2, \dots, \underline{m}_{i_{\max}}\right) = \left(\underline{m}_1, \underline{m}_2, \dots, \underline{m}_{L_m + (K-1)W}\right) \tag{5}$$

The first P elements of this vector $\underline{\mathbf{m}}$ are the same ones as in vector $\underline{\mathbf{m}}_P$, the following elements repeat the beginning:

$$\underline{m}_i = \underline{m}_{i-P}$$
 for the subset $i = (P+1), \dots, i_{\text{max}}$ (6)

Using this periodic basic midamble sequence $\underline{\mathbf{m}}$ for each user k a midamble $\underline{\mathbf{m}}^{(k)}$ of length L_m is derived, which can be written as a user specific vector:

$$\mathbf{\underline{m}}^{(k)} = \left(\underline{m}_{1}^{(k)}, \underline{m}_{2}^{(k)}, ..., \underline{m}_{L_{m}}^{(k)}\right) \tag{7}$$

The L_m midamble elements $\underline{m}_{i}^{(k)}$ are generated for each midamble of the k users (k = 1,...,K) based on:

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K-k)W} \text{ with } i = 1,...,L_{m} \text{ and } k = 1,...,K$$
 (8)

The midamble sequences derived according to equations (7) to (8) have complex values and are not subject to channelisation or scrambling process, i.e. the elements $\underline{m}_i^{(k)}$ represent complex chips for usage in the pulse shaping process at modulation.

The term 'a midamble code set' or 'a midamble code family' denotes K specific midamble codes $\underline{\mathbf{m}}^{(k)}$; k=1,...,K, based on a single basic midamble code \mathbf{m}_p according to (1).

5A.2.3a Training sequences for dedicated carrier MBSFN

When the entire carrier is dedicated to MBSFN, preamble is used for the training sequences in each timeslot. In this case, for all timeslots employing MBSFN operation, only a single preamble is needed, i.e. $K_{Cell}=1$, then all physical channels in such timeslots employ the same preamble with the same allocation strategies.

For dedicated carrier MBSFN, the preamble has a fixed length of L_p =96, and the generation of preamble is the same as in the 1.28 Mcps TDD cf. [5A.2.3 Training sequences for spread bursts], which is corresponding to:

K=1,
$$W = \left| \frac{P}{K} \right|$$
, P=64

Note: that |x| denotes the largest integer number less or equal to x.

The preamble is generated from one of the basic preamble codes shown in table AA.1a.

The mapping of these Basic Preamble Codes to MBSFN Cell Parameters is shown in [8].

5A.2.4 Beamforming

Beamforming is same as that of the 3.84Mcps TDD, cf. [5.2.4 Beamforming].

Beamforming is not applicable to DL time slots with MBSFN transmission.

5A.3 Common physical channels

5A.3.1 Primary common control physical channel (P-CCPCH)

The BCH as described in section 4.1.2 'Common Transport Channels' is mapped onto the Primary Common Control Physical Channels (P-CCPCH1 and P-CCPCH2). The position (time slot / code) of the P-CCPCHs is fixed in the 1.28Mcps TDD. The P-CCPCHs are mapped onto the first two code channels of timeslot#0 with spreading factor of 16. When the entire carrier is dedicated to MBSFN, the P-CCPCH is mapped onto the first two code channels of MS timeslot with spreading factor of 16. The P-CCPCH is always transmitted with an antenna pattern configuration that provides whole cell coverage.

In a multi-frequency cell the carrier which transmits P-CCPCH is called the primary frequency and the others are called secondary frequencies. A multi-frequency cell has only one primary frequency.

5A.3.1.1 P-CCPCH Spreading

The P-CCPCH uses fixed spreading with a spreading factor SF = 16. The P-CCPCH1 and P-CCPCH2 always use channelisation code $c_{Q=16}^{(k=1)}$ and $c_{Q=16}^{(k=2)}$ respectively.

5A.3.1.2 P-CCPCH Burst Format

The burst format as described in section 5A.2.2 is used for the P-CCPCH. No TFCI is applied for the P-CCPCH.

5A.3.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5A.2.3 are used for the P-CCPCH. When the entire carrier is dedicated to MBSFN, the training sequences, i.e. preambles, as described in subclause 5A.2.3.a are used for the P-CCPCH.

5A.3.2 Secondary common control physical channel (S-CCPCH)

PCH and FACH as described in subclause 4.1.2 are mapped onto one or more secondary common control physical channels (S-CCPCH). In this way the capacity of PCH and FACH can be adapted to the different requirements. The time slot and codes used for the S-CCPCH are broadcast on the BCH.

In a multi-frequency cell S-CCPCH shall be transmitted only on the primary frequency.

5A.3.2.1 S-CCPCH Spreading

Except for physical channels in MBSFN time slot, the S-CCPCH uses fixed spreading with a spreading factor SF = 16. as described in subclause 5A.2.1. And the S-CCPCH in MBSFN time slot may use spreading with spreading factor SF = 1, 2 or 16.

Note: SF=2 is only used on dedicated MBSFN frequency.

5A.3.2.2 S-CCPCH Burst Format

The burst format as described in section 5A.2.2 is used for the S-CCPCH. TFCI may be applied for S-CCPCHs.

5A.3.2.3 S-CCPCH Training sequences

The training sequences, i.e. midambles, as described in the subclause 5A.2.3 are also used for the S-CCPCH.

5A.3.3 Fast Physical Access CHannel (FPACH)

The Fast Physical Access CHannel (FPACH) is used by the Node B to carry, in a single burst, the acknowledgement of a detected signature with timing and power level adjustment indication to an user equipment. FPACH makes use of one code with spreading factor 16, so that its burst is composed by 44 symbols. The spreading code, training sequence and time slot position are configured by the network and signalled on the BCH.

In a multi-frequency cell the FPACH is transmitted on the primary frequency. The FPACH may also be also transmitted on the secondary frequency in case of handover or E-DCH procedure.

5A.3.3.1 FPACH burst

The FPACH burst contains 32 information bits. Table 8J reports the content description of the FPACH information bits and their priority order:

Table 8J: FPACH information bits description

Information field	Length (in bits)
Signature Reference Number	3 (MSB)
Relative Sub-Frame Number	2
Received starting position of the UpPCH (UpPCH _{POS})	11
Transmit Power Level Command for RACH message	7
Extended part of Received starting position of the UpPCH (UpPCH _{POS})	2
Reserved bits (default value: 0)	7 (LSB)

The use and generation of the information fields is explained in [9].

5A.3.3.1.1 Signature Reference Number

The reported number corresponds to the numbering principle for the cell signatures as described in [8].

The Signature Reference Number value range is 0-7 coded in 3 bits such that:

bit sequence(0 0 0) corresponds to the first signature of the cell; ...; bit sequence (1 1 1) corresponds to the 8th signature of the cell.

5A.3.3.1.2 Relative Sub-Frame Number

The Relative Sub-Frame Number value range is 0-3 coded such that:

bit sequence (0 0) indicates one sub-frame difference; ...; bit sequence (1 1) indicates 4 sub-frame difference.

5A.3.3.1.3 Received starting position of the UpPCH (UpPCH_{POS})

The size of $UpPCH_{POS}$ is extended to be 13bits and the received starting position of the UpPCH value range is 0-8191coded such that:

The 11 least significant bits (LSB) of $UpPCH_{POS}$ are transmitted in the Received starting position of the UpPCHinformation field and the 2 most significant bits (MSB) of UpPCH_{POS} are transmitted in the first 2bits of the Reserve bits information field. Bit sequence (0 0 ... 0 0 0) indicates the received starting position zero chip; ...; bit sequence (1 1 ... 1 1 1) indicates the received starting position 8191*1/8 chip.

5A.3.3.1.4 Transmit Power Level Command for the RACH message

The transmit power level command is transmitted in 7 bits.

5A.3.3.2 FPACH Spreading

The FPACH uses only spreading factor SF=16 as described in subclause 5A.3.3. The set of admissible spreading codes for use on the FPACH is broadcast on the BCH.

5A.3.3.3 **FPACH Burst Format**

The burst format as described in section 5A.2.2 is used for the FPACH.

5A.3.3.4 **FPACH Training sequences**

The training sequences, i.e. midambles, as described in subclause 5A.2.3 are used for FPACH.

5A.3.3.5 **FPACH** timeslot formats

The FPACH uses slot format #0 of the DL time slot formats given in subclause 5A.2.2.4.1.1.

5A.3.4 The physical random access channel (PRACH)

The RACH as described in subclause 4.1.2 is mapped onto one or more uplink physical random access channels (PRACH). In such a way the capacity of RACH can be flexibly scaled depending on the operators need.

In a multi-frequency cell the PRACH shall be transmitted only on the primary frequency.

5A.3.4.1 PRACH Spreading

The uplink PRACH uses either spreading factor SF=16, SF=8 or SF=4 as described in subclause 5A.2.1. The set of admissible spreading codes for use on the PRACH and the associated spreading factors are broadcast on the BCH (within the RACH configuration parameters on the BCH).

5A.3.4.2 PRACH Burst Format

The burst format as described in section 5A.2.2 is used for the PRACH.

5A.3.4.3 PRACH Training sequences

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of a single periodic basic code. The basic midamble codes as described in subclause 5A.2.3 are used for PRACH.

5A.3.4.4 PRACH timeslot formats

The PRACH uses the following time slot formats taken from the uplink timeslot formats described in sub-clause 5A.2.2.4.1.2:

Spreading Factor	Slot Format #
16	0
8	10
4	25

5A.3.4.5 Association between Training Sequences and Channelisation Codes

The association between training sequences and channelisation codes of PRACH in the 1.28McpsTDD is same as that of the DPCH.

5A.3.5 The synchronisation channels (DwPCH, UpPCH)

There are two dedicated physical synchronisation channels —DwPCH and UpPCH in each 5ms sub-frame of the 1.28Mcps TDD. The DwPCH is used for the down link synchronisation and the UpPCH is used for the uplink synchronisation.

The position and the contents of the DwPCH are equal to the DwPTS as described in the subclause 5A.1., while the position and the contents of the UpPCH are equal to the UpPTS or other uplink access position indicated by the higher layers.

The DwPCH is transmitted at each sub-frame with an antenna pattern configuration which provides whole cell coverage. Furthermore it is transmitted with a constant power level which is signalled by higher layers.

In a multi-frequency cell the DwPCH shall be transimitted only on the primary frequency. The UpPCH is transmitted on the primary frequency. The UpPCH may also be transmitted on the secondary frequencies in case of handover and the E-RUCCH procedure.

The burst structure of the DwPCH (DwPTS) is described in the figure 18I.

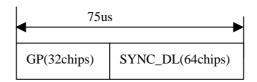


Figure 18I: burst structure of the DwPCH (DwPTS)

Note: 'GP' for 'Guard Period'

The burst structure of the UpPCH (UpPTS) is described in the figure 18J.

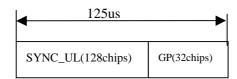


Figure 18J: burst structure of the UpPCH (UpPTS)

The SYNC-DL code in DwPCH and the SYNC-UL code in UpPCH are not spreaded. The details about the SYNC-DL and SYNC-UL code are described in the corresponding subclause and annex in [8].

5A.3.6 Physical Uplink Shared Channel (PUSCH)

For Physical Uplink Shared Channel (PUSCH) the burst structure of DPCH as described in subclause 5A.2 and the training sequences as described in subclause 5A.2.3 shall be used. PUSCH provides the possibility for transmission of TFCI, SS, and TPC in uplink.

The PUSCH is common with 3.84 Mcps TDD with respect to Spreading and UE selection, cf. [5.3.5 Physical Uplink Shared Channel (PUSCH)].

5A.3.7 Physical Downlink Shared Channel (PDSCH)

For Physical Downlink Shared Channel (PDSCH) the burst structure of DPCH as described in subclause 5A.2 and the training sequences as described in subclause 5A.2.3 shall be used. PDSCH provides the possibility for transmission of TFCI, SS, and TPC in downlink.

The PDSCH is common with 3.84 Mcps TDD with respect to Spreading and UE selection, cf. [5.3.6 Physical Downlink Shared Channel (PDSCH)].

5A.3.8 The Page Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

The PICH may be associated with

- an S-CCPCH to which a PCH transport channel is mapped, or
- an HS-SCCH associated with the HS-PDSCH(s) to which an HS-DSCH transport channel is mapped, or

an HS-PDSCH to which an HS-DSCH transport channel carrying paging message is mapped.

In a multi-frequency cell the PICH shall be transmitted only on the primary frequency.

5A.3.8.1 Mapping of Paging Indicators to the PICH bits

Figure 18K depicts the structure of a PICH transmission and the numbering of the bits within the bursts. The burst type as described in [5A.2.2 'Burst Format'] is used for the PICH. N_{PIB} bits are used to carry the paging indicators, where N_{PIB} =352.

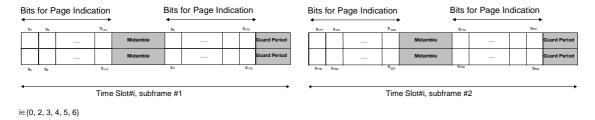


Figure 18K: Transmission and numbering of paging indicator carrying bits in the PICH bursts

Each paging indicator P_q (where P_q , $q=0,...,N_{Pl}$ -1, $P_q \in \{0,1\}$) in one radio frame is mapped to the bits $\{s_{2L_{pl}*q+1},...,s_{2L_{pl}*(q+1)}\}$ in subframe #1 or subframe #2.

The setting of the paging indicators and the corresponding PICH bits is described in [7].

 N_{PI} paging indicators of length L_{PI} =2, L_{PI} =4 or L_{PI} =8 symbols are transmitted in each radio frame that contains the PICH. The number of paging indicators N_{PI} per radio frame is given by the paging indicator length, which signalled by higher layers. In table 8K this number is shown for the different possibilities of paging indicator lengths.

Table 8K: Number N_{Pl} of paging indicators per radio frame for different paging indicator lengths L_{Pl}

	L _{PI} =2	L _{PI} =4	L _{PI} =8
N _{Pl} per radio frame	88	44	22

5A.3.8.2 Structure of the PICH over multiple radio frames

The structure of the PICH over multiple radio frames is common with 3.84 Mcps TDD, cf. [5.3.7.2 Structure of the PICH over multiple radio frames]

5A.3.9 High Speed Physical Downlink Shared Channel (HS-PDSCH)

The HS-DSCH as described in subclause 4.1.2 is mapped onto one or more high speed physical downlink shared channels (HS-PDSCH). In a multi-frequency HS-DSCH cell, HS-PDSCHs may be transmitted on one or more carriers in CELL_DCH state and on only one carrier in CELL_FACH, CELL_PCH and URA_PCH state in a TTI to a UE and the carriers allocated to the UE shall be on contiguous frequencies. In CELL_FACH state, the HS-PDSCHs shall be transmitted on a same carrier as the one on which the uplink transmission resources are allocated to the UE. This carrier can be the primary frequency or the secondary frequency. In CELL_PCH and URA_PCH state, HS-PDSCHs can only be transmitted on the primary frequency. For UE not supporting multi-carrier HS-DSCH reception, the HS-PDSCHs shall be allocated on a same carrier as the one on which the associated DPCH or the uplink transmission resources is allocated.

5A.3.9.1 HS-PDSCH Spreading

For the UEs not configured in MIMO mode, the HS-PDSCH shall use either spreading factor SF = 16 or SF=1, as described in 5.2.1.1.

For the UEs configured in MIMO mode, if SF=16 is configured by higher layers [19] to be not supported for dual stream transmission, the HS-PDSCH shall use spreading factor SF=1 only. Otherwise, the HS-PDSCH shall use either spreading factor SF=16 or SF=1.

Spreading of the HS-PDSCH is common with 3.84 Mcps TDD, cf. [5.3.9.1HS-PDSCH Spreading]

5A.3.9.2 HS-PDSCH Burst Format

The burst format as described in section 5A.2.2 shall be used for the HS-PDSCH.

5A.3.9.3 HS-PDSCH Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the HS-PDSCH.

5A.3.9.4 UE Selection

UE selection is common with 3.84 Mcps TDD, cf. [5.3.9.4 UE selection].

5A.3.9.5 HS-PDSCH timeslot formats

An HS-PDSCH may use QPSK, 16QAM or 64QAM modulation symbols. The time slot formats are shown in table 8KA.

Slot Midamble N_{TFCI} Nss & NTPC Bits/slot N_{data/data} N_{Data/Slot} N_{data/data} **Format** length (chips) (bits) (bits) field(1) code field(2) # (bits) (bits) word (bits) 0 (QPSK) 16 144 0 & 0 88 88 44 44 Λ 1 (16QAM) 88 16 144 0 0 & 0 176 176 88 2 (QPSK) 1408 1 144 0 0 & 0 1408 704 704 3 (16QAM) 1 144 0 0 & 0 2816 2816 1408 1408 4(64QAM) 16 144 0 0 & 0 132 132 264 264 5 (64QAM) 1 144 0 0 & 0 4224 4224 2112 2112 6(QPSK) 16 144 0 2 & 2 88 84 44 40 7(16QAM) 16 144 0 2 & 2 172 168 88 80 8(QPSK) 144 1408 1404 704 1 0 2 & 2 700 9(16QAM) 144 2808 1408 2 & 2 2812 1400

Table 8KA: Time slot formats for the HS-PDSCH

Note: Time slot format 6-9 are exclusively used for semi-persistent HS-PDSCH resources. Whether data field is QPSK or 16QAM modulated, QPSK modulation is used for SS and TPC symbols.

5A.3.9.6 Transmission of SS and TPC

For the transmissions on the semi-persistent HS-PDSCH resources without an HS-SCCH, the SS and TPC command for HS-SICH can be conveyed in HS-PDSCH. The transmission of SS and TPC is done in the data parts of the traffic burst. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the SS information, which is transmitted after the midamble. The SS and TPC are transmitted using the physical channel with the lowest physical channel number and the timeslot with the lowest timeslot number.

5A.3.10 Shared Control Channel for HS-DSCH (HS-SCCH)

The HS-SCCH is a DL physical channel that carries higher layer control information for HS-DSCH. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SCCH the structure of which is described below. A number of HS-SCCH types are defined for different purpose, and the actual description is given in [7].

The information on the HS-SCCH is carried by two separate physical channels (HS-SCCH1 and HS-SCCH2). The term HS-SCCH refers to the ensemble of these physical channels.

In CELL_FACH or CELL_PCH state, HS-SCCH order may carry an uplink synchronization establishment command. The structure is the same as described above.

In case of multi-carrier HS-DSCH reception, the HS-DSCH transmission on each allocated carrier is associated with its respective HS-SCCHs. The HS-SCCHs and HS-SICHs controlling the same HS-DSCH transmission on a carrier for the same UE shall be allocated on a same carrier.

5A.3.10.1 HS-SCCH Spreading

Spreading of the HS-SCCH is common with 3.84 Mcps TDD, cf. [5.3.10.1 HS-SCCH Spreading].

5A.3.10.2 HS-SCCH Burst Format

The burst format as described in section 5A.2.2 shall be used for the HS-SCCH.

5A.3.10.3 HS-SCCH Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the HS-SCCH.

5A.3.10.4 HS-SCCH timeslot formats

HS-SCCH1 shall use time slot format #5 and HS-SCCH2 shall use time slot format #0 from table 8F, see section 5A.2.2.4.1.1, i.e. HS-SCCH shall carry TPC and SS but no TFCI.

5A.3.11 Shared Information Channel for HS-DSCH (HS-SICH)

The HS-SICH is a UL physical channel that carries higher layer control information and the Channel Quality Indicator CQI for HS-DSCH. If there is associated HS-SICH to an HS-SCCH order, the HS-SICH carries the acknowledgement to the HS-SCCH order command. The HS-SICH may also used as the acknowledgement for an HS-SCCH allocating semi-persistent HS-PDSCH resources. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SICH the structure of which is described below.

In case of multi-carrier HS-DSCH reception, the HS-DSCH transmission on each allocated carrier is related to its respective HS-SICHs. The HS-SCCHs and HS-SICHs controlling the same HS-DSCH transmission on a carrier for the same UE shall be allocated on a same carrier.

5A.3.11.1 HS-SICH Spreading

The HS-SICH shall use spreading factor SF = 16, as described in 5.2.1.2.

When MIMO dual-stream is transmitted, the HS-SICH shall use spreading factor SF=8 which shall utilize an additional SF=16 channelisation code along the branch with the higher code numbering of the allowed OVSF sub tree.

5A.3.11.2 HS-SICH Burst Format

The burst format as described in section 5A.2.2 shall be used for the HS-SICH.

5A.3.11.3 HS-SICH Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the HS-SICH.

5A.3.11.4 HS-SICH timeslot formats

The HS-SICH Type 1 shall use time slot format #5 while HS-SICH Type 2 shall use time slot format #20 from table 8G, see section 5A.2.2.4.1.2, i.e., it shall carry TPC and SS but no TFCI. For HS-SICH type 2, two identical TPC symbols denoting one TPC command are transmitted directly after the two identical SS symbols denoting one SS command, which are transmitted after the midamble.

5A.3.12 The MBMS Indicator Channel (MICH) type1

The MBMS Indicator Channel (MICH) type1 is a physical channel used to carry the MBMS notification indicators on a non MBSFN dedicated carrier. The UE may use multiple MICH within the MBMS modification period in order to make decisions on individual MBMS notification indicators.

5A.3.12.1 Mapping of MBMS Indicators to the type1 MICH bits

Figure 18L depicts the structure of a type1 MICH transmission and the numbering of the bits within the bursts. The burst type as described in [5A.2.2 'Burst Format'] is used for the MICH. N_{NIB} bits are used to carry the MBMS notification indicators, where N_{NIB} =352.

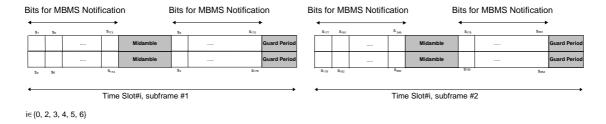


Figure 18L: Transmission and numbering of MBMS notification indicator carrying bits in a type1

MICH burst

Each notification indicator N_q (where N_q , $q=0,...,N_n-1,N_q\in\{0,1\}$) in one radio frame is mapped to the bits $\{s_{2L_{NI}^*q+1},...,s_{2L_{NI}^*(q+1)}\}$ in subframe #1 or subframe #2.

The setting of the MBMS notification indicators and the corresponding type1 MICH bits is described in [7].

 N_n MBMS notification indicators of length L_{Ni} =2, L_{Ni} =4 or L_{Ni} =8 symbols are transmitted in each radio frame that contains the MICH. The number of MBMS notification indicators N_{Ni} per radio frame is given by the MBMS notification indicator length, which is signalled by higher layers. In table 8KB this number is shown for the different possibilities of MBMS notification indicator lengths.

Table 8KB: Number N_{NI} of MBMS notification indicators per radio frame on type1 MICH for different MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
N _n per radio frame	88	44	22

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = NI \mod N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on MICH type1 should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5A.3.12aThe MBMS Indicator Channel (MICH) type 2

The MBMS Indicator Channel (MICH) type 2 is a physical channel used to carry the MBMS notification indicators and system information change indicator on a MBSFN dedicated carrier only. The UE may use multiple MICH within the MBMS modification period in order to make decisions on individual MBMS notification indicators.

5A.3.12.1 Mapping of MBMS Indicators to the type 2 MICH bits

Figure 18La depicts the structure of a type 2 MICH transmission and the numbering of the bits within the bursts. The burst type as described in [5A.2.2a 'MS Burst Format'] is used for the type 2 MICH. $2*L_{NI}$ bits are used to carry the system information change indicators and $N_{NIB} - 2*L_{NI}$ bits are used to carry the MBMS notification indicators, where N_{NIB} =128 for 10ms long MICH type 2.

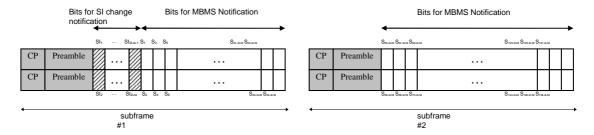


Figure 18La: Transmission and numbering of MBMS notification indicator carrying bits in a type 2

MICH burst

Each notification indicator N_q (where N_q , $q=0,...,N_n-1,N_q\in\{0,1\}$) in one radio frame is mapped to the bits $\{s_{2L_{NI}*q+1},...,s_{2L_{NI}*(q+1)}\}$ in subframe #1 or subframe #2.

The setting of the MBMS notification indicators and the corresponding MICH bits is described in [7].

 N_n MBMS notification indicators of length L_{NI} =2, L_{NI} =4 or L_{NI} =8 symbols are transmitted in each radio frame that contains the MICH. The number of MBMS notification indicators N_{NI} per MICH length is given by the MBMS notification indicator length, which is signalled by higher layers. In table 8KBa this number is shown for the different possibilities of MBMS notification indicator lengths.

Table 8KBa: Number N_{NI} of MBMS notification indicators per radio frame on type 2 MICH for different MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
N _n per radio frame	31	15	7

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = NI \mod N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on type 2 MICH should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5A.3.13 Physical Layer Common Control Channel (PLCCH)

The Physical Layer Common Control Channel (PLCCH) is a Node B terminated channel which may be used to carry dedicated (UE-specific) TPC and SS information to multiple UEs. The PLCCH carries TPC and SS information only. No higher layer data is mapped to PLCCH. Each uplink CCTrCH is controlled either by PLCCH or by other appropriate downlink physical channels, under the control of higher layer signalling.

5A.3.13.1 PLCCH Spreading

The PLCCH uses only spreading factor SF=16 as described in subclause 5A.2.1. The spreading codes for use on the PLCCH are indicated by higher layers.

5A.3.13.2 PLCCH Burst Type

The burst format as described in section 5A2.2 is used for the PLCCH.

5A.3.13.3 PLCCH Training Sequence

The training sequences as described in subclause 5A.2.3 are used for PLCCH.

5A.3.13.4 PLCCH timeslot formats

The PLCCH shall use time slot format #0 from table 8G, see section 5A.2.2.4.1.2.

5A.3.14 E-DCH Physical Uplink Channel

UE may have E-PUCH on each carrier. The E-PUCH on one carrier has at least one E-UCCH and one TPC on it. The TPC on the E-PUCH is used to carry the TPC command for the associated downlink control channel on the same carrier. The E-PUCH on one carrier and the E-UCCH and TPC mapped on it obey the following description.

One or more E-PUCH on one carrier are used to carry the uplink E-DCH transport channel and associated control information (E-UCCH) in each E-DCH TTI. In a timeslot designated by UTRAN for E-PUCH use, up to one E-PUCH may be transmitted by a UE.

5A.3.14.1 E-UCCH

The E-DCH Uplink Control Channel (E-UCCH) carries uplink control information associated with the E-DCH and is mapped to E-PUCH on the same carrier. Depending on the configuration of the number of E-UCCH instances and the number of E-PUCH timeslots, an E-PUCH burst may or may not contain E-UCCH and TPC. When E-PUCH does contain E-UCCH, TPC is also transmitted. When E-PUCH does not contain E-UCCH, TPC is not transmitted.

One E-UCCH instance:

- is of length 32 physical channel bits
- is mapped to the data field of the E-PUCH
- is spread at SF appointed by CRRI
- uses QPSK modulation

There shall be at least one E-UCCH and TPC in every E-DCH TTI. Multiple instances of the same E-UCCH information and TPC can be transmitted within an E-DCH TTI, the detailed number of instances can be set by NodeB MAC-e/i for scheduled transmissions and signalled by higher layers for non-scheduled transmissions. When an E-DCH data block is transmitted on multiple (N) timeslots in one TTI, there will be multiple E-PUCH timeslots. All repetitions of E-UCCH and TPC are evenly distributed on multiple E-PUCH timeslots. N is the number of timeslots of the E-PUCH, M is the number of E-UCCH and TPC instances in one TTI; K is the integral part of M/N; L is the residue of M/N. S is the number of E-UCCHs and TPCs in one E-PUCH timeslot. S equals K+1 for the first L E-PUCH timeslots and equals K for the last (N-L) E-PUCH timeslots.

The burst composition of the E-UCCH information and the E-DCH data is shown in figure 18M.

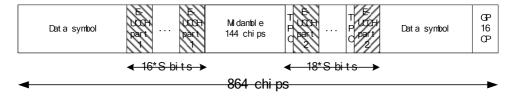


Figure 18M: Multiplexing structure of E-DCH and E-UCCH

An E-UCCH is composed of 32 bits: k_0 , k_1 ... k_{31} . It is segmented evenly into two parts shown in figure 18N.

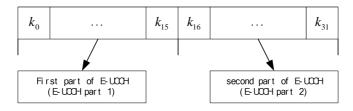


Figure 18N: E-UCCH code composition

Figures 18O and 18P show the E-PUCH data burst with and without the E-UCCH/TPC fields.

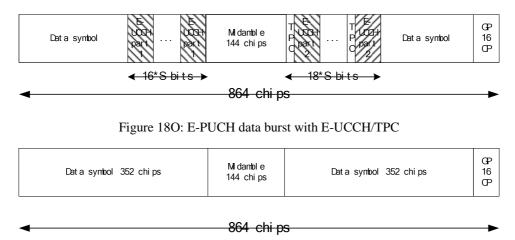


Figure 18P: E-PUCH data burst without E-UCCH/TPC

5A.3.14.2 E-PUCH Spreading

The spreading factors that can be applied to the E-PUCH are SF = 1, 2, 4, 8, 16 as described in subclause 5A.2.1. All E-PUCH use the same spreading factor within an E-DCH TTI. For scheduled transmissions, E-PUCHs use the spreading factor indicated by CRRI on E-AGCH.

5A.3.14.3 E-PUCH Burst Types

The burst types as described in subclause 5A.2.2 can be used for E-PUCH. E-UCCH and TPC can be transmitted on the E-PUCH.

In case that TPC on non-scheduled E-PUCH is not used to adjust transmitting power level of downlink DPCH, Node B should not apply TPC commands received from non-scheduled E-PUCH.

5A.3.14.4 E-PUCH Training Sequences

The training sequences as desribed in subclause 5A.2.3 are used for the E-PUCH.

5A.3.14.5 UE Selection

UEs that shall transmit on the E-PUCH are selected by higher layers. The UE id on the associated E-AGCH shall be used for identification.

5A.3.14.6 E-PUCH timeslot formats

An E-PUCH may use QPSK or 16QAM modulation symbols and may or may not contain E-UCCH/TPC. The time slot formats are shown in table 8KC.

Table 8KC: Time slot formats for the E-PUCH

Slot Format	0	4	2	2	4	_		7	0	0	40	4.4	40	40
Slot Format #	0 (QPSK)	1 (16QAM)	2 (QPSK)	3 (16QAM)	4 (QPSK)	5 (16QAM)	6 (QPSK)	7 (16QAM)	8 (QPSK)	9 (16QAM)	10 (QPSK)	11 (16QAM)	12 (QPSK)	13 (16QAM)
Spreading	16	16	16	16	16	16	8	8	8	8	8	8	8	8
Factor	.0	10	.0	.0		.0		Ò	Ü	Ŭ	Ü	Ü	Ü	Ü
Midamble length	144	144	144	144	144	144	144	144	144	144	144	144	144	144
(chips)														
Bits/slot	88	176	88	142	88	108	176	352	176	318	176	284	176	250
N _{Data/Slot} (bits)	88	176	54	108	20	40	176	352	142	284	108	216	74	148
N _{data/data} field(1) (bits)	44	88	28	56	12	24	88	176	72	144	56	112	40	80
N _{EUCCH8_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH7_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH6_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH5_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH4_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH3_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{EUCCH2_part1} (bits)	0	0	0	0	16	16	0	0	0	0	16	16	16	16
N _{EUCCH1_part1} (bits)	0	0	16	16	16	16	0	0	16	16	16	16	16	16
N _{TPC1} (bits)	0	0	2	2	2	2	0	0	2	2	2	2	2	2
N _{EUCCH1_part2} (bits)	0	0	16	16	16	16	0	0	16	16	16	16	16	16
N _{TPC2} (bits)	0	0	0	0	2	2	0	0	0	0	2	2	2	2
N _{EUCCH2_part2} (bits)	0	0	0	0	16	16	0	0	0	0	16	16	16	16
N _{TPC3} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	2	2
N _{EUCCH3_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{TPC4} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH4_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{TPC5} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH5_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{TPC6} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH6_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{TPC7} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH7_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{TPC8} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH8_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{data/data field(2)}	44	88	26	52	8	16	88	176	70	140	52	104	34	68

Slot	t Format	0	1	2	3	4	5	6	7	8	9	10	11	12	13
	#	(QPSK)	(16QAM)												
((bits)														

Slot Format	14	15	16	17	18	19	20	21	22	23	24	25	26	27
#	(QPSK)	(16QAM)												
Spreading Factor	8	8	4	4	4	4	4	4	4	4	4	4	4	4
Midamble length (chips)	144	144	144	144	144	144	144	144	144	144	144	144	144	144
Bits/slot	176	216	352	704	352	670	352	636	352	602	352	568	352	534
N _{Data/Slot} (bits)	40	80	352	704	318	636	284	568	250	500	216	432	182	364
N _{data/data field(1)} (bits)	24	48	176	352	160	320	144	288	128	256	112	224	96	192
N _{EUCCH8_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH7_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH6_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH5_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{EUCCH4_part1} (bits)	16	16	0	0	0	0	0	0	0	0	16	16	16	16
N _{EUCCH3_part1} (bits)	16	16	0	0	0	0	0	0	16	16	16	16	16	16
N _{EUCCH2_part1} (bits)	16	16	0	0	0	0	16	16	16	16	16	16	16	16
N _{EUCCH1_part1} (bits)	16	16	0	0	16	16	16	16	16	16	16	16	16	16
N _{TPC1} (bits)	2	2	0	0	2	2	2	2	2	2	2	2	2	2
N _{EUCCH1_part2} (bits)	16	16	0	0	16	16	16	16	16	16	16	16	16	16
N _{TPC2} (bits)	2	2	0	0	0	0	2	2	2	2	2	2	2	2
N _{EUCCH2_part2} (bits)	16	16	0	0	0	0	16	16	16	16	16	16	16	16
N _{TPC3} (bits)	2	2	0	0	0	0	0	0	2	2	2	2	2	2
N _{EUCCH3_part2} (bits)	16	16	0	0	0	0	0	0	16	16	16	16	16	16
N _{TPC4} (bits)	2	2	0	0	0	0	0	0	0	0	2	2	2	2
N _{EUCCH4_part2} (bits)	16	16	0	0	0	0	0	0	0	0	16	16	16	16
N _{TPC5} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	2	2
N _{EUCCH5_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{TPC6} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH6_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{TPC7} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH7_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Slot Format #	14 (QPSK)	15 (16QAM)	16 (QPSK)	17 (16QAM)	18 (QPSK)	19 (16QAM)	20 (QPSK)	21 (16QAM)	22 (QPSK)	23 (16QAM)	24 (QPSK)	25 (16QAM)	26 (QPSK)	27 (16QAM)
N _{TPC8} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{EUCCH8_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N _{data/data field(2)} (bits)	16	32	176	352	158	316	140	280	122	244	104	208	86	172

Slot Format	28	29	30	31	32	33	34	35	36	37	38	39	40	41
#	(QPSK)	(16QAM)												
Spreading Factor	4	4	4	4	4	4	2	2	2	2	2	2	2	2
Midamble length (chips)	144	144	144	144	144	144	144	144	144	144	144	144	144	144
Bits/slot	352	500	352	466	352	432	704	1408	704	1374	704	1340	704	1306
N _{Data/Slot} (bits)	148	296	114	228	80	160	704	1408	670	1340	636	1272	602	1204
N _{data/data field(1)} (bits)	80	160	64	128	48	96	352	704	336	672	320	640	304	608
N _{EUCCH8_part1} (bits)	0	0	0	0	16	16	0	0	0	0	0	0	0	0
N _{EUCCH7_part1} (bits)	0	0	16	16	16	16	0	0	0	0	0	0	0	0
N _{EUCCH6_part1} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{EUCCH5_part1} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{EUCCH4_part1} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{EUCCH3_part1} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	16	16
N _{EUCCH2_part1} (bits)	16	16	16	16	16	16	0	0	0	0	16	16	16	16
N _{EUCCH1_part1} (bits)	16	16	16	16	16	16	0	0	16	16	16	16	16	16
N _{TPC1} (bits)	2	2	2	2	2	2	0	0	2	2	2	2	2	2
N _{EUCCH1_part2} (bits)	16	16	16	16	16	16	0	0	16	16	16	16	16	16
N _{TPC2} (bits)	2	2	2	2	2	2	0	0	0	0	2	2	2	2
N _{EUCCH2_part2} (bits)	16	16	16	16	16	16	0	0	0	0	16	16	16	16
N _{TPC3} (bits)	2	2	2	2	2	2	0	0	0	0	0	0	2	2
N _{EUCCH3_part2} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	16	16
N _{TPC4} (bits)	2	2	2	2	2	2	0	0	0	0	0	0	0	0
N _{EUCCH4_part2} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{TPC5} (bits)	2	2	2	2	2	2	0	0	0	0	0	0	0	0
N _{EUCCH5_part2} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{TPC6} (bits)	2	2	2	2	2	2	0	0	0	0	0	0	0	0

Slot Format #	28 (QPSK)	29 (16QAM)	30 (QPSK)	31 (16QAM)	32 (QPSK)	33 (16QAM)	34 (QPSK)	35 (16QAM)	36 (QPSK)	37 (16QAM)	38 (QPSK)	39 (16QAM)	40 (QPSK)	41 (16QAM)
N _{EUCCH6_part2} (bits)	16	16	16	16	16	16	0	0	0	0	0	0	0	0
N _{TPC7} (bits)	0	0	2	2	2	2	0	0	0	0	0	0	0	0
N _{EUCCH7_part2} (bits)	0	0	16	16	16	16	0	0	0	0	0	0	0	0
N _{TPC8} (bits)	0	0	0	0	2	2	0	0	0	0	0	0	0	0
N _{EUCCH8_part2} (bits)	0	0	0	0	16	16	0	0	0	0	0	0	0	0
N _{data/data field(2)} (bits)	68	136	50	100	32	64	352	704	334	668	316	632	298	596

Slot Format #	42 (QPSK)	43 (16QAM)	44 (QPSK)	45 (16QAM)	46 (QPSK)	47 (16QAM)	48 (QPSK)	49 (16QAM)	50 (QPSK)	51 (16QAM)	52 (QPSK)	53 (16QAM)	54 (QPSK)	55 (16QAM)
Spreading Factor	2	2	2	2	2	2	2	2	2	2	1	1	1	1
Midamble length (chips)	144	144	144	144	144	144	144	144	144	144	144	144	144	144
Bits/slot	704	1272	704	1238	704	1204	704	1170	704	1136	1408	2816	1408	2782
N _{Data/Slot} (bits)	568	1136	534	1068	500	1000	466	932	432	864	1408	2816	1374	2748
N _{data/data field(1)} (bits)	288	576	272	544	256	512	240	480	224	448	704	1408	688	1376
N _{EUCCH8_part1} (bits)	0	0	0	0	0	0	0	0	16	16	0	0	0	0
N _{EUCCH7_part1} (bits)	0	0	0	0	0	0	16	16	16	16	0	0	0	0
N _{EUCCH6_part1} (bits)	0	0	0	0	16	16	16	16	16	16	0	0	0	0
N _{EUCCH5_part1} (bits)	0	0	16	16	16	16	16	16	16	16	0	0	0	0
N _{EUCCH4_part1} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0
N _{EUCCH3_part1} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0
N _{EUCCH2_part1} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0
N _{EUCCH1_part1} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	16	16
N _{TPC1} (bits)	2	2	2	2	2	2	2	2	2	2	0	0	2	2
N _{EUCCH1_part2} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	16	16
N _{TPC2} (bits)	2	2	2	2	2	2	2	2	2	2	0	0	0	0
N _{EUCCH2_part2} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0
N _{TPC3} (bits)	2	2	2	2	2	2	2	2	2	2	0	0	0	0
N _{EUCCH3_part2} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0
N _{TPC4} (bits)	2	2	2	2	2	2	2	2	2	2	0	0	0	0
N _{EUCCH4_part2} (bits)	16	16	16	16	16	16	16	16	16	16	0	0	0	0

Slot Format #	42 (QPSK)	43 (16QAM)	44 (QPSK)	45 (16QAM)	46 (QPSK)	47 (16QAM)	48 (QPSK)	49 (16QAM)	50 (QPSK)	51 (16QAM)	52 (QPSK)	53 (16QAM)	54 (QPSK)	55 (16QAM)
N _{TPC5} (bits)	0	0	2	2	2	2	2	2	2	2	0	0	0	0
N _{EUCCH5_part2} (bits)	0	0	16	16	16	16	16	16	16	16	0	0	0	0
N _{TPC6} (bits)	0	0	0	0	2	2	2	2	2	2	0	0	0	0
N _{EUCCH6_part2} (bits)	0	0	0	0	16	16	16	16	16	16	0	0	0	0
N _{TPC7} (bits)	0	0	0	0	0	0	2	2	2	2	0	0	0	0
N _{EUCCH7_part2} (bits)	0	0	0	0	0	0	16	16	16	16	0	0	0	0
N _{TPC8} (bits)	0	0	0	0	0	0	0	0	2	2	0	0	0	0
N _{EUCCH8_part2} (bits)	0	0	0	0	0	0	0	0	16	16	0	0	0	0
N _{data/data field(2)} (bits)	280	560	262	524	244	488	226	452	208	416	704	1408	686	1372

Slot Format	56 (QPSK)	57 (16QAM)	58 (QPSK)	59 (16QAM)	60 (QPSK)	61 (16QAM)	62 (QPSK)	63 (16QAM)	64 (QPSK)	65 (16QAM)	66 (QPSK)	67 (16QAM)	68 (QPSK)	69 (16QAM)
Spreading Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Midamble length (chips)	144	144	144	144	144	144	144	144	144	144	144	144	144	144
Bits/slot	1408	2748	1408	2714	1408	2680	1408	2646	1408	2612	1408	2578	1408	2544
N _{Data/Slot} (bits)	1340	2680	1306	2612	1272	2544	1238	2476	1204	2408	1170	2340	1136	2272
N _{data/data field(1)} (bits)	672	1344	656	1312	640	1280	624	1248	608	1216	592	1184	576	1152
N _{EUCCH8_part1} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{EUCCH7_part1} (bits)	0	0	0	0	0	0	0	0	0	0	16	16	16	16
N _{EUCCH6_part1} (bits)	0	0	0	0	0	0	0	0	16	16	16	16	16	16
N _{EUCCH5_part1} (bits)	0	0	0	0	0	0	16	16	16	16	16	16	16	16
N _{EUCCH4_part1} (bits)	0	0	0	0	16	16	16	16	16	16	16	16	16	16
N _{EUCCH3_part1} (bits)	0	0	16	16	16	16	16	16	16	16	16	16	16	16
N _{EUCCH2_part1} (bits)	16	16	16	16	16	16	16	16	16	16	16	16	16	16
N _{EUCCH1_part1} (bits)	16	16	16	16	16	16	16	16	16	16	16	16	16	16
N _{TPC1} (bits)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N _{EUCCH1_part2} (bits)	16	16	16	16	16	16	16	16	16	16	16	16	16	16
N _{TPC2} (bits)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
N _{EUCCH2_part2} (bits)	16	16	16	16	16	16	16	16	16	16	16	16	16	16
N _{TPC3} (bits)	0	0	2	2	2	2	2	2	2	2	2	2	2	2

Slot Format #	56 (QPSK)	57 (16QAM)	58 (QPSK)	59 (16QAM)	60 (QPSK)	61 (16QAM)	62 (QPSK)	63 (16QAM)	64 (QPSK)	65 (16QAM)	66 (QPSK)	67 (16QAM)	68 (QPSK)	69 (16QAM)
N _{EUCCH3_part2} (bits)	0	0	16	16	16	16	16	16	16	16	16	16	16	16
N _{TPC4} (bits)	0	0	0	0	2	2	2	2	2	2	2	2	2	2
N _{EUCCH4_part2} (bits)	0	0	0	0	16	16	16	16	16	16	16	16	16	16
N _{TPC5} (bits)	0	0	0	0	0	0	2	2	2	2	2	2	2	2
N _{EUCCH5_part2} (bits)	0	0	0	0	0	0	16	16	16	16	16	16	16	16
N _{TPC6} (bits)	0	0	0	0	0	0	0	0	2	2	2	2	2	2
N _{EUCCH6_part2} (bits)	0	0	0	0	0	0	0	0	16	16	16	16	16	16
N _{TPC7} (bits)	0	0	0	0	0	0	0	0	0	0	2	2	2	2
N _{EUCCH7_part2} (bits)	0	0	0	0	0	0	0	0	0	0	16	16	16	16
N _{TPC8} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	2	2
N _{EUCCH8_part2} (bits)	0	0	0	0	0	0	0	0	0	0	0	0	16	16
N _{data/data field(2)} (bits)	668	1336	650	1300	632	1264	614	1228	596	1192	578	1156	560	1120

5A.3.15 E-DCH Random Access Uplink Control Channel (E-RUCCH)

The E-RUCCH is used to carry E-DCH-associated uplink control signalling when E-PUCH resources are not available. It shall be mapped to the same random access physical resources defined by UTRAN.

For multi-carrier E-DCH transmission, each UE is configured with only one carrier for the E-RUCCH transmission. The E-RUCCH on the configured carrier shall be mapped to the same random access physical resources defined by UTRAN on the same carrier.

5A.3.15.1 E-RUCCH Spreading

The E-RUCCH uses spreading factor SF=16 or SF=8 as described in subclause 5A.2.1. The set of admissible spreading codes used on the E-RUCCH are based on the spreading codes of PRACH.

5A.3.15.2 E-RUCCH Burst Format

The burst format as described in section 5A.2.2 is used for the E-RUCCH.

5A.3.15.3 E-RUCCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5A.2.3 are used for E-RUCCH.

5A.3.15.4 E-RUCCH timeslot formats

The timeslot format depends on the spreading factor of the E-RUCCH:

Spreading Factor	Slot Format #
16	0
8	10

5A.3.16 E-DCH Absolute Grant Channel (E-AGCH)

The E-DCH Absolute Grant Channel (E-AGCH) on one carrier is a downlink physical channel carrying the uplink E-DCH absolute grant control information of the same carrier. The E-AGCH on one carrier uses two separate physical channels (E-AGCH1 and E-AGCH2). The term E-AGCH refers to the ensemble of these physical channels. The detailed description of the E-AGCH on one carrier is given below.

5A.3.16.1 E-AGCH Spreading

Spreading of the E-AGCH is common with 3.84Mcps TDD, cf. [5.3.15.1 E-AGCH Spreading].

5A.3.16.2 E-AGCH Burst Types

The burst structures for E-AGCH1 and E-AGCH2 are shown in figure 18Q and 18R.

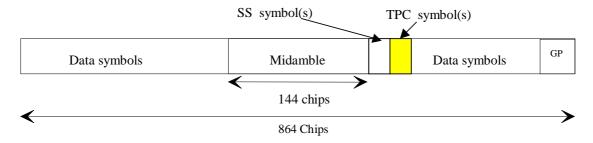


Figure 18Q: E-AGCH1 burst structure

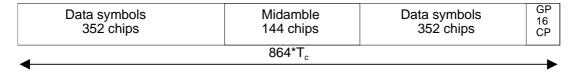


Figure 18R: E-AGCH2 burst structure

5A.3.16.3 E-AGCH Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the E-AGCH.

5A.3.16.4 E-AGCH timeslot formats

E-AGCH1 shall use time slot format #5 and E-AGCH2 shall use time slot format #0 from table 8F, see section 5A.2.2.4.1.1, i.e. E-AGCH shall carry TPC and SS for E-PUCH power control and synchronization but no TFCI.

Slot **Spreading** Midamble N_{TFCI code} word Nss&N_{TPC} Bits/slot N_{Data/Slot} N_{data/data} N_{data/data} **Format Factor** length (bits) (bits) (bits) field (1) field (2) (chips) # (bits) (bits) 0 16 144 0 0&0 88 88 44 44 144 44 16 2&2 88 84 40 0

Table 8KD: Timeslot formats for the E-AGCH

5A.3.17 E-DCH Hybrid ARQ Acknowledgement Indicator Channel (E-HICH)

The E-DCH HARQ Acknowledgement indicator channel (E-HICH) on one carrier is defined in terms of a SF16 downlink physical channel and a signature sequence on the same carrier.

The E-HICH on one carrier carries one or multiple users' acknowledgement indicator on the same carrier. The detailed description of the E-HICH on one carrier is given below.

Figure 18S illustrates the structure of the E-HICH on one carrier. The E-HICH contains 8 spare bit locations. The spare bit values are undefined. The power of each user's acknowledgement indicator may be set independently by the Node-B. The number of E-HICHs in a cell is configured by the system.

The acknowledgement indicators for the E-PUCH semi-persistent scheduling operation can be transmitted on the same E-HICH carrying indicators for scheduled traffic or the E-HICH carrying indicators for non-scheduled traffic.

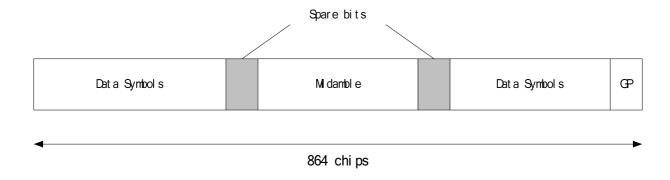


Figure 18S: E-HICH Structure

For Scheduled transmissions, at most four E-HICHs can be configured for one user's scheduled transmission. Which E-HICH is used to convey the HARQ acknowledgment indicator is indicated by the 2-bit E-HICH indicator on E-AGCH. A single E-HICH may carry one or multiple HARQ acknowledgment indicator(s) which are decided by the Node-B.

For Non-Scheduled transmissions, E-HICHs carry not only the HARQ acknowledgement indicators but also TPC and SS commands. The 80 signature sequences are divided into 20 groups while each group includes 4 sequences. Every non-scheduled user is assigned only one group which are signalled by higher layer. Among the 4 sequences, the first one is used to indicate ACK/NACK, and the other three are used to indicate the TPC/SS commands. The three sequences and their three reverse sequences are the six possible sequences used to indicate the TPC/SS combination state. The reverse sequence is constructed by reverse every bit of the sequence from 0 to 1 or from 1 to 0. The mapping between the index and the TPC/SS command is shown in table 8KE . The index is calculated according to the equation: index=2*A+B, (A=0,1,2; B=0,1). A is the relative index of the selected sequence among the three assigned sequences and B equals to 1 when the reverse sequence is chosen, otherwise, B equals to 0. The power of the sequence used for TPC/SS indication can be set differently from the one used to indicate ACK/NACK.

Table 8KE: Mapping between the index and TPC/SS command

index	TPC command	SS command
0	'DOWN'	'DOWN'
1	'UP'	'DOWN'
2	'DOWN'	'UP'
3	'UP'	'UP'
4	'DOWN'	'Do Nothing'
5	'UP'	'Do Nothing'

For the E-DCH semi-persistent scheduling operation, E-HICHs carry not only the HARQ acknowledgement indicators but also TPC and SS commands. Each user is also assigned one signature sequence group including 4 sequences whose usage is completely complying with the definition in non-scheduled transmissions.

The acknowledgement indicator for an E-DCH transmission in TTI "N" is carried by the E-HICH in TTI "N+ $[T_A]$ " (T_A is determined according to the value of $n_{E\text{-HICH}}$). The E-HICH is thus synchronously related to those E-DCH transmissions for which it carries acknowledgement information.

5A.3.17.1 E-HICH Spreading

Multiple users' signature sequences (including the inserted spare bits) sharing the same channelisation code are combined and spread using spreading factor SF=16 as described in [8].

5A.3.17.2 E-HICH Burst Types

The burst structures for E-HICH are shown in figure 18D.

5A.3.17.3 E-HICH Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the E-HICH.

5A.3.17.4 E-HICH timeslot formats

E-HICH shall use time slot format #0 from table 8F.

5A.3.18 Standalone midamble channel

5A.3.18.1 Standalone midamble channel Burst Format

A standalone midamble channel traffic burst consists of a midamble of 144 chips only. The burst format is shown in Figure 18T. The contents of the traffic burst fields are described in table 8KF.

Table 8KF: The contents of the standalone midamble channel traffic burst format fields

Chip number (CN)	Length of field in chips	Contents of field
0-351	352	NULL
352-495	144	Midamble
496-863	368	NULL

NULL	Midamble	NULL
352 chips	144 chips	368 chips
	864*T _c	

Figure 18T: Burst structure of the standalone midamble channel traffic burst format

5A.3.18.3 Standalone midamble channel Training Sequences

The training sequences as described in subclause 5A.2.3 are used for the standalone midamble channel.

5A.3.18.4 Standalone midamble channel timeslot formats

The timeslot formats for the standalone midamble channel are shown in table 8KG.

Table 8KG: Timeslot formats for the standalone midamble channel

Slot Format #	Midamble length (chips)	N _{TFCI} code word (bits)	N _{SS} & N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0	144	0	0 & 0	0	0	0	0

5A.4 Transmit Diversity for DL Physical Channels

Table 8L summarizes the different transmit diversity schemes for different downlink physical channel types in 1.28Mcps TDD that are described in [9].

Table 8L: Application of Tx diversity schemes on downlink physical channel types in 1.28Mcps TDD "X" – can be applied, "–" – must not be applied

Physical channel type	Open loop	TxDiversity	Closed loop TxDiversity
	TSTD	SCTD	
P-CCPCH	X(†)	X(†)	_
S-CCPCH	X(†)	X(†)	_
DwPCH	Χ	ı	_
DPCH	Χ	ı	X
PDSCH	X	Χ	X
PICH	Χ	X	-
MICH	X(†)	X(†)	-
PLCCH	X	Χ	-
HS-SCCH	-	X	X
HS-PDSCH (UE not in	-	-	X
MIMO mode)			
HS-PDSCH (UE in MIMO	_	_	_
mode)			
E-AGCH		X	X
E-HICH		Х	

- (*) Note: SCTD may only be applied to physical channels when they are allocated to beacon locations.
- (†) Note: that when the entire carrier is dedicated to MBSFN operation, TSTD and SCTD shall not be applied.

5A.5 Beacon characteristics of physical channels

For the purpose of measurements, common physical channels that are allocated to particular locations (time slot, code) shall have particular physical characteristics, called beacon characteristics. Physical channels with beacon characteristics are called beacon channels. The location of the beacon channels is called beacon location. The beacon channels shall provide the beacon function, i.e. a reference power level at the beacon location, regularly existing in each subframe. Thus, beacon channels must be present in each subframe.

5A.5.1 Location of beacon channels

The beacon location is described as follows:

The beacon function shall be provided by the physical channels that are allocated to channelisation code $c_{Q=16}^{(k=1)}$ and $c_{Q=16}^{(k=2)}$ in Timeslot#0.

Note that by this definition the P-CCPCH always has beacon characteristics. In a multi-frequency cell beacon channels are always transmitted on the primary frequency.

5A.5.2 Physical characteristics of the beacon function

The beacon channels shall have the following physical characteristics.

They:

- are transmitted with reference power;
- are transmitted without beamforming;
- use midamble m⁽¹⁾ and m⁽²⁾ exclusively in this time slot

The reference power corresponds to the sum of the power allocated to both midambles $m^{(1)}$ and $m^{(2)}$. Two possibilities exist:

- If SCTD antenna diversity is not applied to beacon channels, all the reference power of any beacon channel is allocated to m⁽¹⁾.
- If SCTD antenna diversity is applied to beacon channels, for any beacon channel midambles m⁽¹⁾ and m⁽²⁾ are each allocated half of the reference power.

5A.6 Midamble Allocation for Physical Channels

Midambles are part of the physical channel configuration which is performed by higher layers. Four different midamble allocation schemes exist:

- UE specific midamble allocation: A UE specific midamble for DL or UL is explicitly assigned by higher layers.
- Default midamble allocation: The midamble for DL or UL is allocated by layer 1 depending on the associated channelisation code.
- Common midamble allocation: The midamble for the DL is allocated by layer 1 depending on the number of channelisation codes currently being present in the DL time slot.
- Speical Default midamble allocation: The midamble for DL or UL is also allocated by layer 1 depending on the associated channelisation code while the association is different from default midamble allocation.

If a midamble is not explicitly assigned and the use of the common midamble allocation scheme is not signalled by higher layers, the midamble shall be allocated by layer 1, based on default or special default midamble allocation scheme. This default or special default midamble allocation scheme is given by a fixed association between midambles and channelisation codes, and shall be applied individually to all channelisation codes within one time slot. Different associations apply for different burst types and cell configurations with respect to the maximum number of midambles.

The associations between channelisation codes and midambles for the default, special default and common midamble allocation differ from the 3.84 Mcps TDD option. The associations are given in Annex AA.2 [Association between Midambles and channelisation Codes for default midamble allocation], Annex AA.3 [Association between Midambles and channelisation Codes for special default midamble allocation]] and BA [Signalling of the number of channelisation codes for the DL common midamble case for 1.28Mcps TDD] respectively.

However, for timeslots employing MBSFN operation there is no single midamble restriction per MBSFN timeslot, i.e. $K_{Cell} \ge 1$, whilst this does not undermine the specification that all physical channels in such timeslots employ the same midamble(s) and thus default and common midamble allocation amount to the same allocation strategies.

5A.6.1 Midamble Allocation for DL Physical Channels

Beacon channels shall always use the reserved midambles $m^{(1)}$ and $m^{(2)}$, see 5A.5. For the other DL physical channels that are located in timeslot #0, midambles shall be allocated based on the default midamble allocation scheme, using the association for K=8 midambles. For all other DL physical channels, the midamble is explicitly assigned by higher layers or allocated by layer 1.

5A.6.1.1 Midamble Allocation by signalling from higher layers

The midamble allocation by signalling is the same like in the 3.84 Mcps TDD cf. [5.6.1.1 Midamble allocation by signalling from higher layers]

5A.6.1.2 Midamble Allocation by layer 1

5A.6.1.2.1 Default midamble

The default midamble allocation by layer 1 is the same like in the 3.84 Mcps TDD cf. [5.6.1.2.1 Default midamble]. The associations between midambles and channelisation codes are given in Annex AA.2 [Association between Midambles and channelisation Codes for default midamble allocation].

If the variable E_DCH_SPS_STATUS = TRUE then two E-HICHs associated with the same midamble shift in the same timeslot can be configured.

5A.6.1.2.2 Common Midamble

The common midamble allocation by layer 1 is the same like in the 3.84 Mcps TDD cf. [5.6.1.2.2 Common midamble]. The respective associations are given in Annex BA [Signalling of the number of channelisation codes for the DL common midamble case for 1.28 Mcps TDD].

5A.6.1.2.3 Special Default Midamble

For MIMO dual stream transmission, there are two patterns (pattern 1 and pattern 2) of the association between midambles and channelisation codes for special default midamble allocation scheme for each cell configurations with respect to the maximum number of midambles.

For MU-MIMO transmission, there are four patterns (pattern 1A, pattern 1B, pattern 2A and pattern 2B) of the association between midambles and channelisation codes for special default midamble allocation scheme for each cell configurations with respect to the maximum number of midambles.

If the UE is configured in MIMO or MU-MIMO mode and the default midamble allocation scheme is signalled to the UE by higher layers, the default or special default midamble allocation scheme can be used. Whether the default or special default midamble allocation scheme is used is signalled to the UE by the related physical channe in [7]. The association between midambles and channelisation codes for the special default midamble allocation scheme for both MIMO dual stream transmission and MU-MIMO transmission are given in Annex AA.3 [Association between Midambles and channelisation Codes for special default midamble allocation].

5A.6.2 Midamble Allocation for UL Physical Channels

The midamble allocation for UL Physical Channels is the same as in the 3.84 Mcps TDD cf. [5.6.2 Midamble allocation for UL Physical Channels]

5A.7 Midamble Transmit Power

When standalone midamble channel is not transmitted, the setting of the midamble transmit power is done as in the 3.84 Mcps TDD option cf. 5.7 'Midamble Transmit Power'

5A.7a Preamble Allocation and Preamble Transmit Power

When the entire carrier is dedicated to MBSFN, for all timeslots employing MBSFN operation, only a single preamble is needed, i.e. $K_{Cell}=1$, then all physical channels in such timeslots employ the same preamble with the same allocation strategies.

There shall be no offset between the sum of the powers allocated to all preambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

5B Physical channels for the 7.68 Mcps option

5B.1 General

All physical channels take a three-layer structure with respect to timeslots, radio frames and system frame numbering (SFN). Depending on the resource allocation, the configuration of radio frames or timeslots becomes different. All physical channels need a guard period in every timeslot. The time slots are used in the sense of a TDMA component to separate different user signals in the time domain. The physical channel signal format is presented in figure 18AA.

A physical channel in the 7.68Mcps TDD option is a burst, which is transmitted in a particular timeslot within allocated Radio Frames. The allocation can be continuous, i.e. the time slot in every frame is allocated to the physical channel or discontinuous, i.e. the time slot in a subset of all frames is allocated only. A burst is the combination of two data parts, a midamble part and a guard period. The duration of a burst is one time slot. Several bursts can be transmitted at the same time from one transmitter. In this case, the data parts must use different OVSF channelisation codes, but the same scrambling code. The midamble parts are either identically or differently shifted versions of a cell-specific basic midamble code, see section 5B.3.3. Note when in MBSFN operation, a midamble is not necessarily cell-specific.

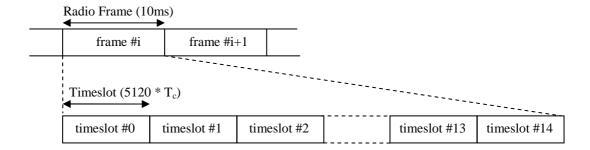


Figure 18AA: Physical channel signal format

The data part of the burst is spread with a combination of channelisation code and scrambling code. The channelisation code is an OVSF code, that can have a spreading factor of 1, 2, 4, 8, 16 or 32. The data rate of the physical channel depends on the used spreading factor of the used OVSF code.

The midamble part of the burst can contain two different types of midambles: a short one of length 512 chips, or a long one of length 1024 chips. The data rate of the physical channel depends on the used midamble length. Additionally, when in MBSFN operation a midamble of length 640 chips is used.

So a physical channel is defined by frequency, timeslot, channelisation code, burst type and Radio Frame allocation. The scrambling code and the basic midamble code are broadcast and may be constant within a cell. When a physical channel is established, a start frame is given. The physical channels can either be of infinite duration, or of a duration defined by allocation.

5B.2 Frame structure

The TDMA frame has a duration of 10 ms and is subdivided into 15 time slots (TS) of $5120*T_c$ duration each. A time slot corresponds to 5120 chips. The physical content of the time slots are the bursts of corresponding length as described in subclause 5B.3.2.

Each 10 ms frame consists of 15 time slots, each allocated to either the uplink or the downlink (figure 18AB). With such a flexibility, the TDD mode can be adapted to different environments and deployment scenarios. In any configuration at least one time slot has to be allocated for the downlink and at least one time slot has to be allocated for the uplink with the exception of no uplink timeslots when the entire carrier is dedicated to MBSFN.

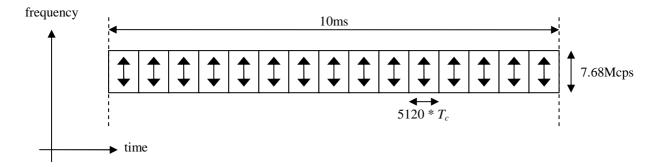


Figure 18AB: The TDD frame structure

Examples for multiple and single switching point configurations as well as for symmetric and asymmetric UL/DL allocations are given in figure 3.

5B.3 Dedicated physical channel (DPCH)

The DCH as described in subclause 4.1.1 is mapped onto the dedicated physical channel.

5B.3.1 Spreading

Spreading is applied to the data part of the physical channels and consists of two operations. The first is the channelisation operation, which transforms every data symbol into a number of chips, thus increasing the bandwidth of the signal. The number of chips per data symbol is called the Spreading Factor (SF). The second operation is the scrambling operation, where a scrambling code is applied to the spread signal. Details on channelisation and scrambling operation can be found in [8].

5B.3.1.1 Spreading for Downlink Physical Channels

Downlink physical channels shall use SF=32 or SF=1.

Multiple parallel physical channels can be used to support higher data rates. Within a timeslot, parallel physical channels shall be transmitted using different channelisation codes, see [8]. These codes with SF =32 are generated as described in [8].

5B.3.1.2 Spreading for Uplink Physical Channels

The range of spreading factors that may be used for uplink physical channels shall range from 32 down to 1. For each physical channel an individual minimum spreading factor SF_{min} is transmitted by means of the higher layers. There are two options that are indicated by UTRAN:

- 1. The UE shall use the spreading factor SF_{min} , independent of the current TFC.
- 2. The UE shall autonomously increase the spreading factor depending on the current TFC.

If the UE autonomously changes the SF, it shall always vary the channelisation code along the branch with the higher code numbering of the allowed OVSF sub tree, as depicted in [8]. In the event that code hopping is configured by higher layers, the allowed OVSF sub-tree is that subtended by the effective allocated OVSF code after the hop sequence has been applied to the allocated OVSF code (see [9]).

For multicode transmission a UE shall use a maximum of two physical channels per timeslot simultaneously. These two parallel physical channels shall be transmitted using different channelisation codes, see [8].

5B.3.2 Burst Types

Four types of bursts are defined. All of them consist of two data symbol fields, a midamble and a guard period, the lengths of which are different for the individual burst types. Thus, the number of data symbols in a burst depends on the SF and the burst type, as depicted in table 8AA.

Table 8AA: Number of data symbols (N) for burst type 1, 2, 3 and 4

Spreading factor (SF)	Burst Type 1	Burst Type 2	Burst Type 3	Burst Type 4
1	3904	4416	3712	4224
2	1952	2208	1856	N/A
4	976	1104	928	N/A
8	488	552	464	N/A
16	244	276	232	N/A
32	122	138	116	132

The support of burst types 1, 2 and 3 is mandatory for UEs supporting transmit and receive functions. UEs supporting transmit and receive functions and also MBSFN operation must additionally support burst type 4. UEs with receive only capability need only support burst type 4. The three different bursts defined here are well suited for different applications, as described in the following sections.

5B.3.2.1 Burst Type 1

Burst type 1 can be used for uplink and downlink. Due to its longer midamble field this burst type supports the construction of a larger number of training sequences. The maximum number of training sequences depends on the cell configuration. For burst type 1 this number may be 4, 8, or 16.

The data fields of burst type 1 are 1952 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 8AA above. The midamble of burst type 1 has a length of 1024 chips. The guard period for the burst type 1 is 192 chip periods long. Burst type 1 is shown in Figure 18AC. The contents of the burst fields are described in table 8AB.

Table 8AB: The contents of burst type 1 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-1951	1952	Cf table 8AA	Data symbols
1952-2975	1024	-	Midamble
2976-4927	1952	Cf table 8AA	Data symbols
4928-5119	192	-	Guard period

Data symbols 1952 chips	Midamble 1024 chips	Data symbols 1952 chips	GP 192 CP
	5120 * T _c		

Figure 18AC: Burst structure of burst type 1. GP denotes the guard period and CP the chip periods

5B.3.2.2 Burst Type 2

Burst type 2 can be used for uplink and downlink. It offers a longer data field than burst type 1 at the cost of a shorter midamble. Due to the shorter midamble field the burst type 2 supports a maximum number of training sequences of 4 or 8 only, depending on the cell configuration.

The data fields of the burst type 2 are 2208 chips long. The corresponding number of symbols depends on the spreading factor, as indicated in table 8AA above. The guard period for the burst type 2 is 192 chip periods long. Burst type 2 is shown in Figure 18AD. The contents of the burst fields are described in table 8AC.

Table 8AC: The contents of burst type 2 fields

Chip number (CN)	Chip number (CN) Length of field in chips		Contents of field
0-2207	2208	cf table 8AA	Data symbols
2208-2719	512	-	Midamble
2720-4927	2208	cf table 8AA	Data symbols
4928-5119	192	-	Guard period

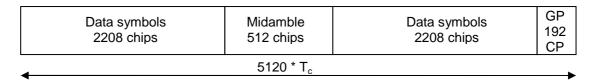


Figure 18AD: Burst structure of the burst type 2. GP denotes the guard period and CP the chip periods

5B.3.2.3 Burst Type 3

Burst type 3 is used for uplink only. Due to the longer guard period it is suitable for initial access or access to a new cell after handover. It offers the same number of training sequences as burst type 1.

The data fields of the burst type 3 have a length of 1952 chips and 1760 chips, respectively. The corresponding number of symbols depends on the spreading factor, as indicated in table 8AA above. The midamble of burst type 3 has a length of 1024 chips. The guard period for the burst type 3 is 384 chip periods long. Burst type 3 is shown in Figure 18AE. The contents of the burst fields are described in table 8AD.

Table 8AD: The contents of burst type 3 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-1951	1952	Cf table 8AA	Data symbols
1952-2975	1024	-	Midamble
2976-4735	1760	Cf table 8AA	Data symbols
4736-5119	384	-	Guard period

	a symbols 52 chips	Midamble 1024 chips	Data symbols 1760 chips	GP 384 CP
4		5120 * T _c		

Figure 18AE: Burst structure of the burst type 3. GP denotes the guard period and CP the chip periods

5B.3.2.3A Burst Type 4

The burst type 4 is used for downlink MBSFN operation only and supports a single training sequence.

The data fields of the burst type 4 are 2112 chips long. The corresponding number of symbols is 132 as indicated in table 8AA above. The midamble of burst type 4 has a length of 640 chips. The guard period for the burst type 4 is 256 chip periods long. The burst type 4 is shown in Figure 18AEA. The contents of the burst fields are described in table 8ADA.

Table 8ADA: The contents of burst type 4 fields

Chip number (CN)	Length of field in chips	Length of field in symbols	Contents of field
0-2111	2112	Cf table 8AA	Data symbols
2112-2751	640	-	Midamble
2752-4863	2112	Cf table 8AA	Data symbols
4864-5119	256	-	Guard period

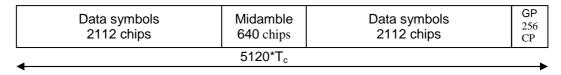


Figure 18AEA: Burst structure of the burst type 4. GP denotes the guard period and CP the chip periods

5B.3.2.4 Transmission of TFCI

All burst types 1, 2, 3 and 4 provide the possibility for transmission of TFCI.

The transmission of TFCI is negotiated at call setup and can be re-negotiated during the call. For each CCTrCH it is indicated by higher layer signalling, which TFCI format is applied, except for the MBSFN FACH where the (16,5) bi-orthogonal code is always used for TFCI when TFCI is applied . Additionally for each allocated timeslot it is signalled individually whether that timeslot carries the TFCI or not. The TFCI is always present in the first timeslot in a radio frame for each CCTrCH. If a time slot contains the TFCI, then it is always transmitted using the physical channel with

the lowest physical channel sequence number (p) in that timeslot. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

The transmission of TFCI is done in the data parts of the respective physical channel. In DL the TFCI code word bits and data bits are subject to the same spreading procedure as depicted in [8]. In DL, the modulation applied to the TFCI code word bits is the same as that applied to the data symbols. In UL, independent of the SF that is applied to the data symbols in the burst, the data in the TFCI field are always spread with SF=32 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TFCI code word is to be transmitted directly adjacent to the midamble, possibly after the TPC. Figure 18AF shows the position of the TFCI code word in a traffic burst in downlink. Figure 18AG shows the position of the TFCI code word in a traffic burst in uplink.

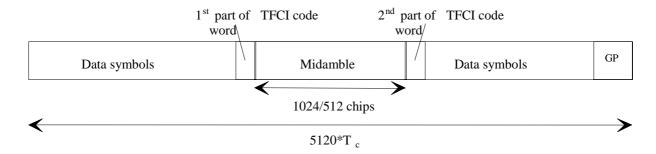


Figure 18AF: Position of the TFCI code word in the traffic burst in case of downlink

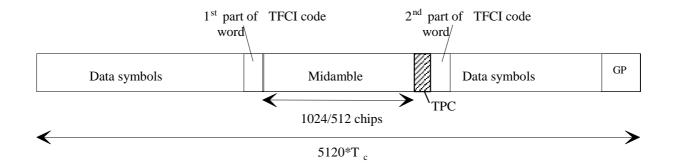


Figure 18AG: Position of the TFCI code word in the traffic burst in case of uplink

Two examples of TFCI transmission in the case of multiple DPCHs used for a connection are given in the Figure 18AH and Figure 18AI below. Combinations of the two schemes shown are also applicable.

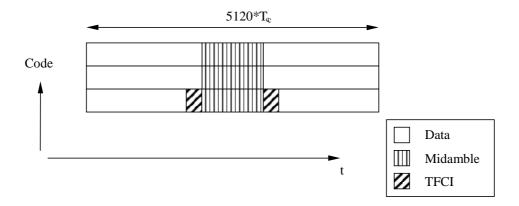


Figure 18AH: Example of TFCI transmission with physical channels multiplexed in code domain

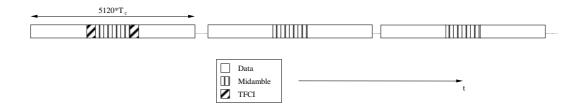


Figure 18AI: Example of TFCI transmission with physical channels multiplexed in time domain

5B.3.2.5 Transmission of TPC

Burst types 1, 2 and 3 for dedicated and shared channels provide the possibility for transmission of TPC in uplink.

The transmission of TPC is done in the data parts of the traffic burst. Independent of the SF that is applied to the data symbols in the burst, the data in the TPC field are always spread with SF=32 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]. Hence the midamble structure and length is not changed. The TPC information is to be transmitted directly after the midamble. Figure 18AJ shows the position of the TPC in a traffic burst.

For every user the TPC information shall be transmitted at least once per transmitted frame. If a TFCI is applied for a CCTrCH, TPC shall be transmitted with the same channelization codes and in the same timeslots as the TFCI. If no TFCI is applied for a CCTrCH, TPC shall be transmitted using the physical channel corresponding to physical channel sequence number p=1. Physical channel sequence numbering is determined by the rate matching function and is described in [7].

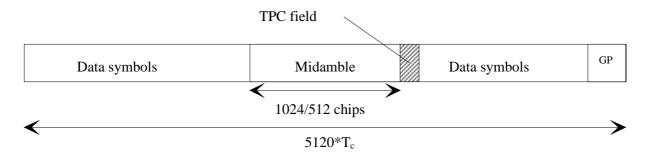


Figure 18AJ: Position of TPC information in the traffic burst

The length of the TPC field is N_{TPC} bits. The TPC field is formed via repetition encoding a single bit b_{TPC} , N_{TPC} times.

The relationship between b_{TPC} and the TPC command is shown in table 8AE.

Table 8AE: TPC bit pattern

b _{TPC}	TPC command	Meaning
0	'Down'	Decrease Tx Power
1	'Up'	Increase Tx Power

5B.3.2.6 Timeslot formats

5B.3.2.6.1 Downlink timeslot formats

The downlink timeslot format depends on the spreading factor, midamble length and on the number of TFCI code word bits, as depicted in the table 8AF. For MBSFN operation the timeslot format also depends upon the symbol modulation scheme used. Slot formats 20-27 are only applicable to MBSFN operation with burst type 4.

Table 8AF: Time slot formats for the Downlink

Slot Format #	Spreading Factor	Midamble length (chips)	NTFCI code word (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field (bits)
0	32	1024	0	244	244	122
1	32	1024	4	244	240	120
2	32	1024	8	244	236	118
3	32	1024	16	244	228	114
4	32	1024	32	244	212	106
5	32	512	0	276	276	138
6	32	512	4	276	272	136
7	32	512	8	276	268	134
8	32	512	16	276	260	130
9	32	512	32	276	244	122
10	1	1024	0	7808	7808	3904
11	1	1024	4	7808	7804	3902
12	1	1024	8	7808	7800	3900
13	1	1024	16	7808	7792	3896
14	1	1024	32	7808	7776	3888
15	1	512	0	8832	8832	4416
16	1	512	4	8832	8828	4414
17	1	512	8	8832	8824	4412
18	1	512	16	8832	8816	4408
19	1	512	32	8832	8800	4400
20 (QPSK)	32	640	0	264	264	132
21 (QPSK)	32	640	16	264	248	124
22 (16QAM)	32	640	0	528	528	264
23 (16QAM)	32	640	16	528	512	256
24 (QPSK)	1	640	0	8448	8448	4224
25 (QPSK)	1	640	16	8448	8432	4216
26 (16QAM)	1	640	0	16896	16896	8448
27 (16QAM)	1	640	16	16896	16880	8440

5B.3.2.6.2 Uplink timeslot formats

The uplink timeslot format depends on the spreading factor, midamble length, guard period length and on the number of TFCI code word bits. Due to TPC, different amount of bits are mapped to the two data fields. The timeslot formats are depicted in the table 8AG. Note that slot format #90 shall only be used for HS_SICH.

Table 8AG: Time slot formats for the Uplink

Slot Format #	Spreading Factor	Midamble length (chips)	Guard Period (chips)	N _{TFCI code} word (bits)	N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0	32	1024	192	0	0	244	244	122	122
1	32	1024	192	0	2	244	242	122	120
2	32	1024	192	4	2	244	238	120	118
3	32	1024	192	8	2	244	234	118	116
4	32	1024	192	16	2	244	226	114	112
5	32	1024	192	32	2	244	210	106	104
6	32	512	192	0	0	276	276	138	138
7	32	512	192	0	2	276	274	138	136
8	32	512	192	4	2	276	270	136	134
9	32	512	192	8	2	276	266	134	132
10	32	512	192	16	2	276	258	130	128
11	32	512	192	32	2	276	242	122	120
12	16	1024	192	0	0	488	488	244	244
13	16	1024	192	0	2	486	484	244	240
14	16	1024	192	4	2	482	476	240	236
15	16	1024	192	8	2	478	468	236	232
16	16	1024	192	16	2	470	452	228	224
17	16	1024	192	32	2	454	420	212	208
18	16	512	192	0	0	552	552	276	276
19	16	512	192	0	2	550	548	276	272
20	16	512	192	4	2	546	540	272	268
21	16	512	192	8	2	542	532	268	264
22	16	512	192	16	2	534	516	260	256
23	16	512	192	32	2	518	484	244	240
24	8	1024	192	0	0	976	976	488	488
25	8	1024	192	0	2	970	968	488	480
26	8	1024	192	4	2	958	952	480	472
27	8	1024	192	8	2	946	936	472	464
28	8	1024	192	16	2	922	904	456	448
29	8	1024	192	32	2	874	840	424	416
30	8	512	192	0	0	1104	1104	552	552
31	8	512	192	0	2	1098	1096	552	544
32	8	512	192	4	2	1086	1080	544	536
33	8	512	192	8	2	1074	1064	536	528
34	8	512	192	16	2	1050	1032	520	512
35	8	512	192	32	2	1002	968	488	480
36	4	1024	192	0	0	1952	1952	976	976
37	4	1024	192	0	2	1938	1936	976	960
38	4	1024	192	4	2	1910	1904	960	944
39	4	1024	192	8	2	1882	1872	944	928
40	4	1024	192	16	2	1826	1808	912	896
41	4	1024	192	32	2	1714	1680	848	832
42	4	512	192	0	0	2208	2208	1104	1104

Slot	Spreading	Midamble	Guard	N _{TFCI code}	N _{TPC}	Bits/slot	N _{Data/Slot}	N _{data/data}	N _{data/data}
Format #	Factor	length (chips)	Period (chips)	word (bits)	(bits)		(bits)	field(1) (bits)	field(2) (bits)
43	4	512	192	0	2	2194	2192	1104	1088
44	4	512	192	4	2	2166	2160	1088	1072
45	4	512	192	8	2	2138	2128	1072	1056
46	4	512	192	16	2	2082	2064	1040	1024
47	4	512	192	32	2	1970	1936	976	960
48	2	1024	192	0	0	3904	3904	1952	1952
49	2	1024	192	0	2	3874	3872	1952	1920
50	2	1024	192	4	2	3814	3808	1920	1888
51	2	1024	192	8	2	3754	3744	1888	1856
52	2	1024	192	16	2	3634	3616	1824	1792
53	2	1024	192	32	2	3394	3360	1696	1664
54	2	512	192	0	0	4416	4416	2208	2208
55	2	512	192	0	2	4386	4384	2208	2176
56	2	512	192	4	2	4326	4320	2176	2144
57	2	512	192	8	2	4266	4256	2144	2112
58	2	512	192	16	2	4146	4128	2080	2048
59	2	512	192	32	2	3906	3872	1952	1920
59a	1	1024	192	0	0	7808	7808	3904	3904
59b	1	1024	192	0	2	7746	7744	3904	3840
59c	1	1024	192	4	2	7622	7616	3840	3776
59d	1	1024	192	8	2	7498	7488	3776	3712
59e	1	1024	192	16	2	7250	7232	3648	3584
59f	1	1024	192	32	2	6754	6720	3392	3328
59g	1	512	192	0	0	8832	8832	4416	4416
59h	1	512	192	0	2	8770	8768	4416	4352
59i	1	512	192	4	2	8646	8640	4352	4288
59j	1	512	192	8	2	8522	8512	4288	4224
59k	1	512	192	16	2	8274	8256	4160	4096
591	1	512	192	32	2	7778	7744	3904	3840
60	32	1024	384	0	0	232	232	122	110
61	32	1024	384	0	2	232	230	122	108
62	32	1024	384	4	2	232	226	120	106
63	32	1024	384	8	2	232	222	118	104
64	32	1024	384	16	2	232	214	114	100
65	32	1024	384	32	2	232	198	106	92
66	16	1024	384	0	0	464	464	244	220
67	16	1024	384	0	2	462	460	244	216
68	16	1024	384	4	2	458	452	240	212
69	16	1024	384	8	2	454	444	236	208
70	16	1024	384	16	2	446	428	228	200
71	16	1024	384	32	2	430	396	212	184
72	8	1024	384	0	0	928	928	488	440
73	8	1024	384	0	2	922	920	488	432
74	8	1024	384	4	2	910	904	480	424
75	8	1024	384	8	2	898	888	472	416
76	8	1024	384	16	2	874	856	456	400
77	8	1024	384	32	2	826	792	424	368
78	4	1024	384	0	0	1856	1856	976	880
79	4	1024	384	0	2	1842	1840	976	864

Slot Format #	Spreading Factor	Midamble length (chips)	Guard Period (chips)	N _{TFCI code} word (bits)	N _{TPC} (bits)	Bits/slot	N _{Data/Slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
80	4	1024	384	4	2	1814	1808	960	848
81	4	1024	384	8	2	1786	1776	944	832
82	4	1024	384	16	2	1730	1712	912	800
83	4	1024	384	32	2	1618	1584	848	736
84	2	1024	384	0	0	3712	3712	1952	1760
85	2	1024	384	0	2	3682	3680	1952	1728
86	2	1024	384	4	2	3622	3616	1920	1696
87	2	1024	384	8	2	3562	3552	1888	1664
88	2	1024	384	16	2	3442	3424	1824	1600
89	2	1024	384	32	2	3202	3168	1696	1472
89a	1	1024	384	0	0	7424	7424	3904	3520
89b	1	1024	384	0	2	7362	7360	3904	3456
89c	1	1024	384	4	2	7238	7232	3840	3392
89d	1	1024	384	8	2	7114	7104	3776	3328
89e	1	1024	384	16	2	6866	6848	3648	3200
89f	1	1024	384	32	2	6370	6336	3392	2944
90	32	1024	192	0	8	244	236	122	114

5B.3.3 Training sequences for spread bursts

In this subclause, the training sequences for usage as midambles in burst type 1, 2, 3 and 4 (see subclause 5B.3.2) are defined. The training sequences, i.e. midambles, of different users active in the same cell and same time slot are cyclically shifted versions of one cell-specific single basic midamble code. In the case of MBSFN timeslots there is only a single midamble and this is derived from a single basic midamble code which is not necessarily cell-specific. The applicable basic midamble codes are given in Annex AB.1, Annex AB.2 and Annex AB.2A. As different basic midamble codes are required for different burst formats, Annex AB.1 shows the basic midamble codes \mathbf{m}_P for burst type 1 and 3, Annex AB.2 shows \mathbf{m}_{PS} for burst type 2 and Annex AB.2A shows \mathbf{m}_P for burst type 4. It should be noted that burst type 2 must not be mixed with burst type 1 or 3 in the same timeslot of one cell and furthermore burst type 4 shall not be mixed with any other burst type in the same timeslot of one cell.

The basic midamble codes in Annex AB.1, Annex AB.2 and Annex AB.2A are listed in hexadecimal notation. The binary form of the basic midamble code shall be derived according to table 6 (section 5.2.3).

For each particular basic midamble code, its binary representation can be written as a vector \mathbf{m}_p :

$$\mathbf{m}_{\mathbf{p}} = \left(m_1, m_2, ..., m_p\right) \tag{1}$$

According to Annex AB.1, the size of this vector \mathbf{m}_P is P=912 for burst type 1 and 3. According to Annex AB.2, the size of this vector \mathbf{m}_P is P=456 for burst type 2. According to Annex AB.2A, the size of vector \mathbf{m}_P is P=384 for burst type 4. As QPSK modulation is used, the training sequences are transformed into a complex form, denoted as the complex vector \mathbf{m}_P :

$$\underline{\mathbf{m}}_{P} = \left(\underline{m}_{1}, \underline{m}_{2}, \dots, \underline{m}_{P}\right) \tag{2}$$

The elements \underline{m}_i of $\underline{\mathbf{m}}_P$ are derived from elements m_i of \mathbf{m}_P using equation (3):

$$\underline{m}_i = (\mathbf{j})^i \cdot m_i \text{ for all } i = 1, ..., P$$
 (3)

Hence, the elements \underline{m}_i of the complex basic midamble code are alternating real and imaginary.

To derive the required training sequences (different shifts), this vector \mathbf{m}_{P} is periodically extended to the size:

$$i_{\text{max}} = L_m + (K'-1)W + |P/K|$$
 (4)

Notes on equation (4):

- L_m: Midamble length
- K': Maximum number of different midamble shifts in a cell, when no intermediate shifts are used. This value depends on the midamble length.
- K: Maximum number of different midamble shifts in a cell, when intermediate shifts are used, K=2K'. This value depends on the midamble length.

Note that intermediate shifts are not used for burst type 4, i.e. K=K'=1 for burst type 4.

- W: Shift between the midambles, when the number of midambles is K'.
- $\lfloor x \rfloor$ denotes the largest integer smaller or equal to x

Allowed values for L_m, K' and W are given in Annex AB.1, Annex AB.2 and Annex AB.2A.

So we obtain a new vector \mathbf{m} containing the periodic basic midamble sequence:

$$\underline{\mathbf{m}} = \left(\underline{m}_1, \underline{m}_2, \dots, \underline{m}_{i_{\text{max}}}\right) = \left(\underline{m}_1, \underline{m}_2, \dots, \underline{m}_{L_m + (K'-1)W + |P/K|}\right) \tag{5}$$

The first P elements of this vector $\underline{\mathbf{m}}$ are the same ones as in vector $\underline{\mathbf{m}}_P$, the following elements repeat the beginning:

$$\underline{m}_i = \underline{m}_{i-P}$$
 for the subset $i = (P+1), ..., i_{\text{max}}$ (6)

Using this periodic basic midamble sequence $\underline{\mathbf{m}}$ for each shift k a midamble $\underline{\mathbf{m}}^{(k)}$ of length L_m is derived, which can be written as a shift specific vector:

$$\underline{\mathbf{m}}^{(k)} = \left(\underline{m}_1^{(k)}, \underline{m}_2^{(k)}, \dots, \underline{m}_{L_m}^{(k)}\right) \tag{7}$$

The L_m midamble elements $\underline{m}_i^{(k)}$ are generated for each midamble of the first K' shifts (k = 1,...,K') based on:

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K'-k)W} \quad \text{with} \quad i = 1, \dots, L_{m} \quad \text{and} \quad k = 1, \dots, K'$$
(8)

The elements of midambles for the second K' shifts (k = (K'+1),...,K = (K'+1),...,2K') are generated based on a slight modification of this formula introducing intermediate shifts:

$$\underline{\boldsymbol{m}}_{i}^{(k)} = \underline{\boldsymbol{m}}_{i+(K-k-1)W+\lfloor P/K \rfloor} \text{ with } i=1,\dots,L_{m} \text{ and } k=K'+1,\dots,K-1$$
 (9)

$$\underline{m}_{i}^{(k)} = \underline{m}_{i+(K'-1)W+\lfloor P/K \rfloor} \text{ with } i = 1, \dots, L_{m} \text{ and } k = K$$

$$(10)$$

The number K_{Cell} of midambles that is supported in each cell can be smaller than K, depending on the cell size and the possible delay spreads, see Annex AB. The number K_{Cell} is signalled by higher layers. The midamble sequences derived according to equations (7) to (10) have complex values and are not subject to channelisation or scrambling process, i.e. the elements $\underline{m}_i^{(k)}$ represent complex chips for usage in the pulse shaping process at modulation.

The term 'a midamble code set' or 'a midamble code family' denotes K specific midamble codes $\underline{\mathbf{m}}^{(k)}$; k=1,...,K, based on a single basic midamble code \mathbf{m}_{P} according to (1).

5B.3.4 Beamforming

Support for beamforming is identical to 3.84Mcps TDD cf. [5.2.4 Beamforming].

5B.4 Common physical channels

5B.4.1 Primary common control physical channel (P-CCPCH)

The BCH as described in subclause 4.1.2 is mapped onto the Primary Common Control Physical Channel (P-CCPCH). The position (time slot / code) of the P-CCPCH is known from the Physical Synchronisation Channel (PSCH), see subclause 5B.4.4.

5B.4.1.1 P-CCPCH Spreading

The P-CCPCH uses fixed spreading with a spreading factor SF = 32 as described in subclause 5B.3.1.1. The P-CCPCH always uses channelisation code $c_{Q=32}^{(k=1)}$.

5B.4.1.2 P-CCPCH Burst Types

Burst type 1 as described in subclause 5B.2.2 is used for the P-CCPCH unless the entire carrier is dedicated to MBSFN then burst type 4 is used for P-CCPCH. No TFCI is applied for the P-CCPCH.

5B.4.1.3 P-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5B.3.3 are used for the P-CCPCH.

5B.4.2 Secondary common control physical channel (S-CCPCH)

PCH and FACH as described in subclause 4.1.2 are mapped onto one or more secondary common control physical channels (S-CCPCH). In this way the capacity of PCH and FACH can be adapted to the different requirements.

5B.4.2.1 S-CCPCH Spreading

The S-CCPCH uses fixed spreading with a spreading factor SF = 32 as described in subclause 5B.3.1.1. When S-CCPCH is used for MBSFN operation the spreading factor may be SF = 32 or SF = 1.

5B.4.2.2 S-CCPCH Burst Types

Burst types 1, 2 or 4 as described in subclause 5B.3.2 are used for the S-CCPCHs. TFCI may be applied for S-CCPCHs.

5B.4.2.2A S-CCPCH Modulation

When S-CCPCH is used for MBSFN operation, burst type 4 shall be used and the modulation may be QPSK or 16QAM, see table 8AF for slot formats. When S-CCPCH is used for all other purposes the modulation shall be QPSK.

5B.4.2.3 S-CCPCH Training sequences

The training sequences, i.e. midambles, as described in subclause 5B.3.3 are used for the S-CCPCH.

5B.4.3 The physical random access channel (PRACH)

The RACH as described in subclause 4.1.2 is mapped onto one uplink physical random access channel (PRACH).

5B.4.3.1 PRACH Spreading

The uplink PRACH uses either spreading factor SF=32 or SF=16 as described in subclause 5B.3.1.2. The set of admissible spreading codes for use on the PRACH and the associated spreading factors are broadcast on the BCH (within the RACH configuration parameters on the BCH).

5B.4.3.2 PRACH Burst Type

The UEs send uplink access bursts of type 3 randomly in the PRACH. TFCI and TPC are not applied for the PRACH.

5B.4.3.3 PRACH Training sequences

The training sequences, i.e. midambles, of different users active in the same time slot are time shifted versions of a basic midamble code, m_1 , or a second basic midamble code, m_2 , which is a time inverted version of the basic midamble code m_1 . The basic midamble codes for burst type 3 are shown in Annex AB. The necessary time shifts are obtained by choosing all k=1,2,3...,K'. Different cells use different periodic basic codes, i.e. different midamble sets.

5B.4.3.4 PRACH timeslot formats

For the PRACH the timeslot format is only spreading factor dependent. The timeslot formats 60 and 66 of table 8AG are applicable for the PRACH.

5B.4.3.5 Association between Training Sequences and Channelisation Codes

For the PRACH the fixed association between a training sequence and associated channelisation code is defined in figure 18AK. In this figure, midamble $\mathbf{m}_{j}^{(k)}$ is formed from the k^{th} shift of the original basic midamble code (j=1) or of the time-inverted basic midamble code (j=2).

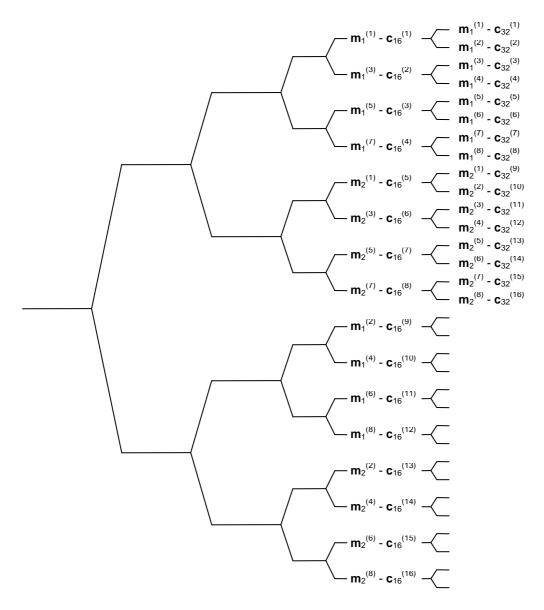


Figure 18AK: Association of midambles to channelisation codes for PRACH in the OVSF tree

5B.4.4 The synchronisation channel (SCH)

The code group of a cell can be derived from the synchronisation channel. In order not to limit uplink/downlink asymmetry, the SCH is mapped on one or two downlink slots per frame only.

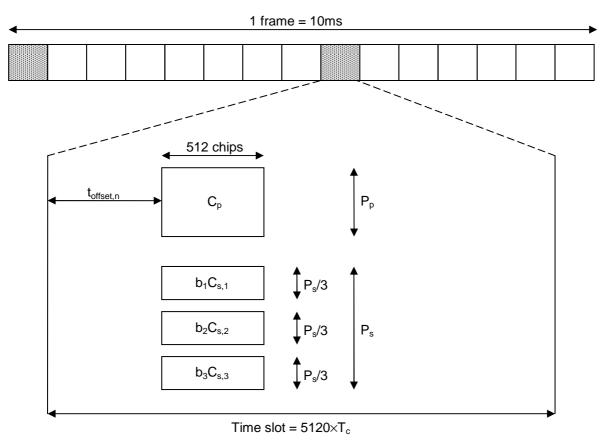
There are two cases of SCH and P-CCPCH allocation as follows:

- Case 1) SCH and P-CCPCH allocated in TS#k, k=0....14
- Case 2) SCH allocated in two TS: TS#k and TS#k+8, k=0...6; P-CCPCH allocated in TS#k.

The position of SCH (value of k) in the frame can change on a long term basis in any case.

Due to this SCH scheme, the position of P-CCPCH is known from the SCH.

Figure 18AL is an example for transmission of SCH, k=0, of Case 2.



 $b_i \in \{\pm 1, \pm j\}, C_{s,i} \in \{C_0, C_1, C_3, C_4, C_5, C_6, C_8, C_{10}, C_{12}, C_{13}, C_{14}, C_{15}\}, i = 1,2,3$; see section 8.4

Figure 18AL: Scheme for Synchronisation channel SCH consisting of one primary sequence C_p and 3 parallel secondary sequences C_{s,i} in slot k and k+8 (example for k=0 in Case 2)

As depicted in figure 18AL, the SCH consists of a primary and three secondary code sequences each 512 chips long. The primary and secondary code sequences are defined in [8].

Due to mobile to mobile interference, it is mandatory for public TDD systems to keep synchronisation between base stations. As a consequence of this, a capture effect concerning SCH can arise. The time offset $t_{\text{offset},n}$ enables the system to overcome the capture effect.

The time offset $t_{offset,n}$ is one of 32 values, depending on the code group of the cell, n, [8]. Note that the cell parameter will change from frame to frame, but the cell will belong to only one code group and thus have one time offset $t_{offset,n}$. The exact value for $t_{offset,n}$, is given by:

$$t_{offset,n} = \begin{cases} n \cdot 96 \cdot T_c & n < 16 \\ (1440 + n \cdot 96) \cdot T_c & n \ge 16 \end{cases}; \quad n = 0,...,31$$

5B.4.5 Physical Uplink Shared Channel (PUSCH)

The USCH as desribed in subclause 4.1.2 is mapped onto one or more physical uplink shared channels (PUSCH). Timing advance, as described in [9], is applied to the PUSCH.

5B.4.5.1 PUSCH Spreading

The spreading factors that can be applied to the PUSCH are SF = 1, 2, 4, 8, 16 or 32 as described in subclause 5B.3.1.2.

5B.4.5.2 PUSCH Burst Types

Burst types 1, 2 or 3 as described in subclause 5B.3.2 can be used for PUSCH. TFCI and TPC can be transmitted on the PUSCH.

5B.4.5.3 PUSCH Training Sequences

The training sequences as desribed in subclause 5B.3.3 are used for the PUSCH.

5B.4.5.4 UE Selection

The UE that shall transmit on the PUSCH is selected by higher layer signalling.

5B.4.6 Physical Downlink Shared Channel (PDSCH)

The DSCH as described in subclause 4.1.2 is mapped onto one or more physical downlink shared channels (PDSCH).

5B.4.6.1 PDSCH Spreading

The PDSCH uses either spreading factor SF = 32 or SF = 1 as described in subclause 5B.3.1.1.

5B.4.6.2 PDSCH Burst Types

Burst types 1 or 2 as described in subclause 5B.3.2 can be used for PDSCH. TFCI can be transmitted on the PDSCH.

5B.4.6.3 PDSCH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the PDSCH.

5B.4.6.4 UE Selection

To indicate to the UE that there is data to decode on the DSCH, higher layer signalling is used.

5B.4.7 The Paging Indicator Channel (PICH)

The Paging Indicator Channel (PICH) is a physical channel used to carry the paging indicators.

5B.4.7.1 Mapping of Paging Indicators to the PICH bits

Figure 18AM depicts the structure of a PICH burst and the numbering of the bits within the burst. The same burst type is used for the PICH in every cell. N_{PIB} bits in a normal burst of type 1 or 2 are used to carry the paging indicators, where N_{PIB} depends on the burst type: N_{PIB} =240 for burst type 1 and N_{PIB} =272 for burst type 2. The bits s_{NPIB+1} ,..., s_{NPIB+4} adjacent to the midamble are reserved for possible future use.

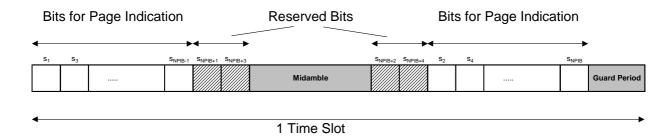


Figure 18AM: Transmission and numbering of paging indicator carrying bits in a PICH burst

Each paging indicator P_q in one time slot is mapped to the bits $\{s_{2Lpi^*q+1},...,s_{2Lpi^*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each paging indicator are transmitted in the first

data part, and the other half of the symbols are transmitted in the second data part; an example is shown in figure 18AN for a paging indicator length L_{PI} of 4 symbols.

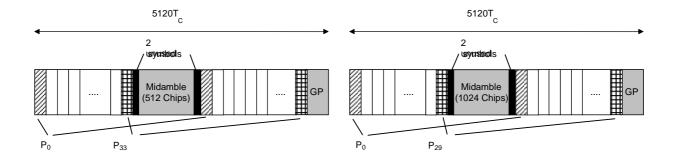


Figure 18AN: Example of mapping of paging indicators on PICH bits for L_{PI}=4

The setting of the paging indicators and the corresponding PICH bits (including the reserved ones) is described in [4].

 N_{PI} paging indicators of length L_{PI} =2, L_{PI} =4 or L_{PI} =8 symbols are transmitted in each radio frame that contains the PICH. The number of paging indicators N_{PI} per radio frame is given by the paging indicator length and the burst type, which are both known by higher layer signalling. In table 8AH this number is shown for the different possibilities of burst types and paging indicator lengths.

Table 8AH: Number N_{Pl} of paging indicators per time slot for the different burst types and paging indicator lengths L_{Pl}

	L _{PI} =2	L _{PI} =4	L _{PI} =8
Burst Type 1	N _{PI} =60	N _{PI} =30	N _{PI} =15
Burst Type 2	N _{PI} =68	N _{PI} =34	N _{PI} =17

5B.4.7.2 Structure of the PICH over multiple radio frames

The structure of PICH over multiple radio frames is identical to the structure of PICH in 3.84Mcps TDD cf [section 5.3.7.2].

5B.4.7.3 PICH Training sequences

The training sequences, i.e. midambles for the PICH are generated as described in subclause 5B.3.3. The allocation of midambles depends on whether SCTD is applied to the PICH.

- If no antenna diversity is applied the PICH the midambles can be allocated as described in subclause 5B.7.
- If SCTD antenna diversity is applied to the PICH the allocation of midambles shall be as described in [9].

5B.4.8 High Speed Physical Downlink Shared Channel (HS-PDSCH)

The HS-DSCH as desribed in subclause 4.1.2 is mapped onto one or more high speed physical downlink shared channels (HS-PDSCH).

5B.4.8.1 HS-PDSCH Spreading

The HS-PDSCH shall use either spreading factor SF = 32 or SF=1, as described in 5B.3.1.1.

5B.4.8.2 HS-PDSCH Burst Types

Burst types 1 or 2 as described in subclause 5B.3.2 can be used for PDSCH. TFCI shall not be transmitted on the HS-PDSCH. The TF of the HS-DSCH is derived from the associated HS-SCCH.

5B.4.8.3 HS-PDSCH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the HS-PDSCH.

5B.4.8.4 UE Selection

To indicate to the UE that there is data to decode on the HS-DSCH, the UE id on the associated HS-SCCH shall be used.

5B.4.8.5 HS-PDSCH timeslot formats

An HS-PDSCH may use QPSK or 16QAM modulation symbols. The time slot formats are shown in table 8AI.

Slot Format Spreading Midamble Bits/slot N_{TFCI code} N_{Data/Slot} N_{data/data} **Factor** length (bits) field (bits) word # (chips) (bits) 0 (QPSK) 32 1024 0 244 244 122 1 (16QAM) 32 1024 0 488 488 244 2 (QPSK) 32 512 0 276 276 138 3 (16QAM) 32 512 0 552 552 276 1024 4 (QPSK) 7808 3904 1 0 7808 5 (16QAM) 15616 15616 7808 1 1024 0 6 (QPSK) 512 8832 8832 4416 0 1 7(16QAM) 1 512 0 17664 17664 8832

Table 8AI: Time slot formats for the HS-PDSCH

5B.4.9 Shared Control Channel for HS-DSCH (HS-SCCH)

The HS-SCCH is a DL physical channel that carries higher layer control information for HS-DSCH. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SCCH the structure of which is described below.

5B.4.9.1 HS-SCCH Spreading

The HS-SCCH shall use spreading factor SF = 32, as described in 5B.3.1.1.

5B.4.9.2 HS-SCCH Burst Types

Burst type 1 as described in subclause 5B.3.2 can be used for HS-SCCH. TFCI shall not be transmitted on the HS-SCCH.

5B.4.9.3 HS-SCCH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the HS-SCCH.

5B.4.9.4 HS-SCCH timeslot formats

The HS-SCCH always uses time slot format #0 from table 8AF, see section 5B.3.2.6.1.

5B.4.10 Shared Information Channel for HS-DSCH (HS-SICH)

The HS-SICH is a UL physical channel that carries higher layer control information and the Channel Quality Indicator CQI for HS-DSCH. The physical layer will process this information according to [7] and will transmit the resulting bits on the HS-SICH the structure of which is described below.

5B.4.10.1 HS-SICH Spreading

The HS-SICH shall use spreading factor SF = 32, as described in 5B.3.1.2.

5B.4.10.2 HS-SICH Burst Types

Burst type 1 as described in subclause 5B.3.2 can be used for HS-SICH. TFCI shall not be transmitted on the HS-SICH, however, the HS-SICH shall carry TPC information.

5B.4.10.3 HS-SICH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the HS-SICH.

5B.4.10.4 HS-SICH timeslot formats

The HS-SICH shall use time slot format #90 from table 8AF, see section 5B.3.2.6.2.

5B.4.11 The MBMS Indicator Channel (MICH)

The MBMS Indicator Channel (MICH) is a physical channel used to carry the MBMS notification indicators. The UE may use multiple MICH within the MBMS modification period in order to make decisions on individual MBMS notification indicators.

5B.4.11.1 Mapping of MBMS Indicators to the MICH bits for burst types 1 and 2

Figure 18AO depicts the structure of a MICH burst and the numbering of the bits within the burst. The same burst type is used for the MICH in every cell. N_{NIB} bits in a normal burst of type 1 or 2 are used to carry the MBMS notification indicators, where N_{NIB} depends on the burst type: N_{NIB} =240 for burst type 1 and N_{NIB} =272 for burst type 2. The bits s_{NNIB+1} ,..., s_{NNIB+4} adjacent to the midamble are reserved for possible future use.

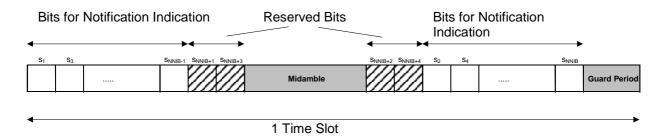


Figure 18AO: Transmission and numbering of MBMS notification indicator carrying bits in a MICH burst using burst types 1 and 2

Each notification indicator N_q in one time slot is mapped to the bits $\{s_{2LNI^*q+1},...,s_{2LNI^*(q+1)}\}$ within this time slot. Thus, due to the interleaved transmission of the bits half of the symbols used for each MBMS notification indicator are transmitted in the first data part, and the other half of the symbols are transmitted in the second data part: an example is shown in figure 18AP for a MBMS notification indicator length L_{NI} of 4 symbols.

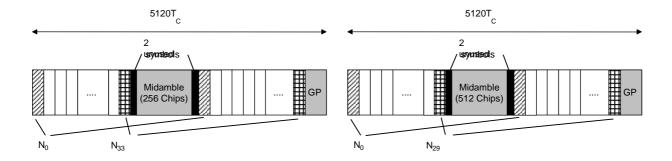


Figure 18AP: Example of mapping of MBMS notification indicators on MICH bits for L_{Ni}=4 for burst types 2 and 1 respectively

The setting of the MBMS notification indicators and the corresponding MICH bits (including the reserved ones) is described in [7].

 N_n MBMS notification indicators of length L_{NI} =2, L_{NI} =4 or L_{NI} =8 symbols are transmitted in each MICH. The number of MBMS notification indicators N_n per MICH is given by the MBMS notification indicator length and the burst type, which are both known by higher layer signalling. In table 18AJ this number is shown for burst types 1 and 2 and differing MBMS notification indicator lengths.

Table 18AJ: Number N_n of MBMS notification indicators per time slot for burst types 1 and 2 and differing MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
Burst Type 1	N _n =60	N _n =30	N _n =15
Burst Type 2	N _n =68	N _n =34	N _n =17

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = \text{NI mod } N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on MICH should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5B.4.11.1A Mapping of MBMS Indicators to the MICH bits for burst type 4

When an entire carrier is dedicated to MBSFN operation, the MICH shall use burst type 4. In this case N_{NIB} =256 and there are 8 reserved/unused bits adjacent to the midamble reserved for possible future use. The transmission and numbering of MBMS notification indicator carrying bits in a MICH burst is similar to that of figure 18AO with the exception of 4 reserved bits either side of the midamble as opposed to 2 for burst types 1 and 2. An example mapping is shown in figure 18AP.1 for a MBMS notification indicator length L_{NI} of 4 symbols.

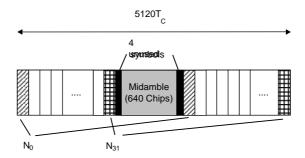


Figure 18AP.1: Example of mapping of MBMS notification indicators on MICH bits for L_{Ni} =4 for burst type 4

The setting of the MBMS notification indicators and the corresponding MICH bits (including the reserved ones) is described in [7].

 N_n MBMS notification indicators of length L_{NI} =2, L_{NI} =4 or L_{NI} =8 symbols are transmitted in each MICH. The number of MBMS notification indicators N_n per MICH is given by the MBMS notification indicator length and the burst type, which are both known by higher layer signalling. In table 18AK this number is shown for the different possibilities of burst types and MBMS notification indicator lengths.

Table 18AK: Number N_n of MBMS notification indicators per time slot for burst type 4 and differing MBMS notification indicator lengths L_{NI}

	L _{NI} =2	L _{NI} =4	L _{NI} =8
Burst Type 4	N _n =64	N _n =32	N _n =16

The value NI (NI = 0, ..., N_{NI} -1) calculated by higher layers, is associated to the MBMS notification indicator N_q , where $q = NI \mod N_n$.

The set of NI passed over the Iub indicates all higher layer NI values for which the notification indicator on MICH should be set to 1 during the corresponding modification period; all other indicators shall be set to 0.

5B.4.11.2 MICH Training sequences

The training sequences, i.e. midambles for the MICH, are generated as described in subclause 5B.3.3. The allocation of midambles depends on whether SCTD is applied to the MICH.

- If no antenna diversity is applied the MICH the midambles can be allocated as described in subclause 5B.7.
- If SCTD antenna diversity is applied to the MICH the allocation of midambles shall be as described in [9].

Note that when the entire carrier is dedicated to MBSFN operation MICH employs burst type 4 as described in subclause 5B.4.11.1A. Burst type 4 supports a single midamble and hence SCTD is precluded from operation in such a scenario.

5B.4.12 E-DCH Physical Uplink Channel (E-PUCH)

One or more E-PUCH are used to carry the uplink E-DCH transport channel and associated control information (E-UCCH) in each E-DCH TTI. In a timeslot designated by UTRAN for E-PUCH use, up to one E-PUCH may be transmitted by a UE. No other physical channels may be transmitted by a UE in an E-PUCH timeslot.

Timing advance, as described in [9], subclause 4.3, is applied to the E-PUCH.

5B.4.12.1 E-UCCH

The E-DCH Uplink Control Channel (E-UCCH) carries uplink control information associated with the E-DCH and is carried within indicator fields mapped to E-PUCH. Depending on the configuration by higher layers, an E-PUCH burst may or may not contain E-UCCH and TPC. When E-PUCH does contain E-UCCH, TPC is also transmitted. When E-PUCH does not contain E-UCCH, TPC is not transmitted.

Higher layers shall indicate the maximum number of timeslots (N_{E-UCCH}) that may contain E-UCCH/TPC in the E-DCH TTI. For an allocation of n_{TS} E-PUCH timeslots, the UE shall transmit E-UCCH and TPC on the first m allocated timeslots of the E-DCH TTI, where $m = \min(n_{TS}, N_{E-UCCH})$.

The E-UCCH comprises two parts, E-UCCH part 1 and E-UCCH part 2.

E-UCCH part 1:

- is of length 32 physical channel bits
- is mapped to the TFCI field of the E-PUCH (16 bits either side of the midamble)
- is spread at SF=32 using the channelisation code in the branch with the highest code numbering of the allowed OVSF sub tree, as depicted in [8]
- uses QPSK modulation

E-UCCH part 2:

- is of length 32 physical channel bits
- is spread using the same spreading factor as the data payloads
- uses the same modulation as the data payloads

Figures 18APA and 18APB show the E-PUCH data burst with and without the E-UCCH/TPC fields.

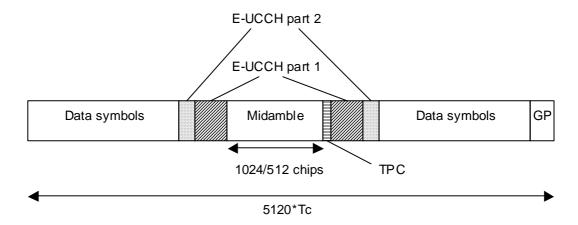


Figure 18APA: Location of E-UCCH part 1, E-UCCH part 2 and TPC in the E-PUCH data burst

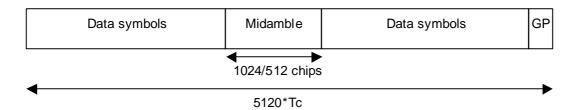


Figure 18APB: E-PUCH data burst without E-UCCH/TPC

5B.4.12.2 E-PUCH Spreading

The spreading factors that can be applied to the E-PUCH are SF = 1, 2, 4, 8, 16, 32 as described in subclause 5B.3.1.2.

5B.4.12.3 E-PUCH Burst Types

Burst types 1, 2 or 3 as described in subclause 5B.3.2 can be used for E-PUCH. E-UCCH and TPC can be transmitted on the E-PUCH.

5B.4.12.4 PUSCH Training Sequences

The training sequences as desribed in subclause 5B.3.3 are used for the E-PUCH.

5B.4.12.5 UE Selection

UEs that shall transmit on the E-PUCH are selected by higher layers. The UE id on the associated E-AGCH shall be used for identification.

5B.4.12.6 E-PUCH timeslot formats

An E-PUCH may use QPSK or 16QAM modulation symbols and may or may not contain E-UCCH/TPC. The time slot formats are shown in table 19.

Table 19: Timeslot formats for E-PUCH

slot format #	SF	Midamble Length (chips)	GP (chips)	N _{EUCCH1} (bits)	N _{EUCCH2} (bits)	N _{TPC} (bits)	Bits/slot	N _{data/slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
0 (QPSK)	32	1024	192	0	0	0	244	244	122	122
1 (16QAM)	32	1024	192	0	0	0	488	488	244	244
2 (QPSK)	32	1024	192	32	32	2	244	178	90	88
3 (16QAM)	32	1024	192	32	32	2	454	388	196	192
4 (QPSK)	32	512	192	0	0	0	276	276	138	138
5 (16QAM)	32	512	192	0	0	0	552	552	276	276
6 (QPSK)	32	512	192	32	32	2	276	210	106	104
7 (16QAM)	32	512	192	32	32	2	518	452	228	224
8 (QPSK)	16	1024	192	0	0	0	488	488	244	244
9 (16QAM)	16	1024	192	0	0	0	976	976	488	488
10 (QPSK)	16	1024	192	32	32	2	454	388	196	192
11 (16QAM)	16	1024	192	32	32	2	874	808	408	400
12 (QPSK)	16	512	192	0	0	0	552	552	276	276
13 (16QAM)	16	512	192	0	0	0	1104	1104	552	552
14 (QPSK)	16	512	192	32	32	2	518	452	228	224
15 (16QAM)	16	512	192	32	32	2	1002	936	472	464
16 (QPSK)	8	1024	192	0	0	0	976	976	488	488
17 (16QAM)	8	1024	192	0	0	0	1952	1952	976	976
18 (QPSK)	8	1024	192	32	32	2	874	808	408	400
19 (16QAM)	8	1024	192	32	32	2	1714	1648	832	816
20 (QPSK)	8	512	192	0	0	0	1104	1104	552	552
21 (16QAM)	8	512	192	0	0	0	2208	2208	1104	1104
22 (QPSK)	8	512	192	32	32	2	1002	936	472	464
23 (16QAM)	8	512	192	32	32	2	1970	1904	960	944
24 (QPSK)	4	1024	192	0	0	0	1952	1952	976	976
25 (16QAM)	4	1024	192	0	0	0	3904	3904	1952	1952
26 (QPSK)	4	1024	192	32	32	2	1714	1648	832	816
27 (16QAM)	4	1024	192	32	32	2	3394	3328	1680	1648
28 (QPSK)	4	512	192	0	0	0	2208	2208	1104	1104
29 (16QAM)	4	512	192	0	0	0	4416	4416	2208	2208
30 (QPSK)	4	512	192	32	32	2	1970	1904	960	944
31 (16QAM)	4	512	192	32	32	2	3906	3840	1936	1904
32 (QPSK)	2	1024	192	0	0	0	3904	3904	1952	1952
33 (16QAM)	2	1024	192	0	0	0	7808	7808	3904	3904
34 (QPSK)	2	1024	192	32	32	2	3394	3328	1680	1648
35 (16QAM)	2	1024	192	32	32	2	6754	6688	3376	3312
36 (QPSK)	2	512	192	0	0	0	4416	4416	2208	2208
37 (16QAM)	2	512	192	0	0	0	8832	8832	4416	4416
38 (QPSK)	2	512	192	32	32	2	3906	3840	1936	1904
39 (16QAM)	2	512	192	32	32	2	7778	7712	3888	3824
40 (QPSK)	1	1024	192	0	0	0	7808	7808	3904	3904
41 (16QAM)	1	1024	192	0	0	0	15616	15616	7808	7808

slot format #	SF	Midamble Length (chips)	GP (chips)	N _{EUCCH1} (bits)	N _{EUCCH2} (bits)	N _{TPC} (bits)	Bits/slot	N _{data/slot} (bits)	N _{data/data} field(1) (bits)	N _{data/data} field(2) (bits)
42 (QPSK)	1	1024	192	32	32	2	6754	6688	3376	3312
43 (16QAM)	1	1024	192	32	32	2	13474	13408	6768	6640
44 (QPSK)	1	512	192	0	0	0	8832	8832	4416	4416
45 (16QAM)	1	512	192	0	0	0	17664	17664	8832	8832
46 (QPSK)	1	512	192	32	32	2	7778	7712	3888	3824
47 (16QAM)	1	512	192	32	32	2	15522	15456	7792	7664
48 (QPSK)	32	1024	384	0	0	0	232	232	122	110
49 (16QAM)	32	1024	384	0	0	0	464	464	244	220
50 (QPSK)	32	1024	384	32	32	2	232	166	90	76
51 (16QAM)	32	1024	384	32	32	2	430	364	196	168
52 (QPSK)	16	1024	384	0	0	0	464	464	244	220
53 (16QAM)	16	1024	384	0	0	0	928	928	488	440
54 (QPSK)	16	1024	384	32	32	2	430	364	196	168
55 (16QAM)	16	1024	384	32	32	2	826	760	408	352
56 (QPSK)	8	1024	384	0	0	0	928	928	488	440
57 (16QAM)	8	1024	384	0	0	0	1856	1856	976	880
58 (QPSK)	8	1024	384	32	32	2	826	760	408	352
59 (16QAM)	8	1024	384	32	32	2	1618	1552	832	720
60 (QPSK)	4	1024	384	0	0	0	1856	1856	976	880
61 (16QAM)	4	1024	384	0	0	0	3712	3712	1952	1760
62 (QPSK)	4	1024	384	32	32	2	1618	1552	832	720
63 (16QAM)	4	1024	384	32	32	2	3202	3136	1680	1456
64 (QPSK)	2	1024	384	0	0	0	3712	3712	1952	1760
65 (16QAM)	2	1024	384	0	0	0	7424	7424	3904	3520
66 (QPSK)	2	1024	384	32	32	2	3202	3136	1680	1456
67 (16QAM)	2	1024	384	32	32	2	6370	6304	3376	2928
68 (QPSK)	1	1024	384	0	0	0	7424	7424	3904	3520
69 (16QAM)	1	1024	384	0	0	0	14848	14848	7808	7040
70 (QPSK)	1	1024	384	32	32	2	6370	6304	3376	2928
71 (16QAM)	1	1024	384	32	32	2	12706	12640	6768	5872

5B.4.13 E-DCH Random Access Uplink Control Channel (E-RUCCH)

The E-RUCCH is used to carry E-DCH-associated uplink control signalling when E-PUCH resources are not available. The characteristics of the E-RUCCH physical channel are identical to those of PRACH (see subclause 5B.4.3).

Physical resources available for E-RUCCH are configured by higher layers. E-RUCCH may be mapped to the same physical resources that are assigned for PRACH.

5B.4.14 E-DCH Absolute Grant Channel (E-AGCH)

The E-DCH Absolute Grant Channel (E-AGCH) is a downlink physical channel carrying the uplink E-DCH absolute grant control information. Unlike other downlink physical channel types, E-AGCH also carries a TPC field (located immediately after the midamble and spread using SF32) which is used to control the E-PUCH power. Figure 18APC illustrates the burst structure of the E-AGCH.

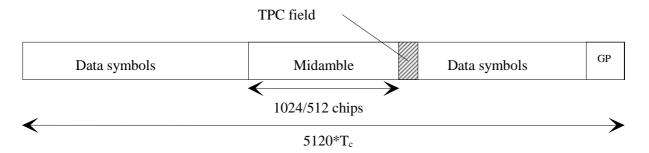


Figure 18APC: Burst structure of E-AGCH

One E-DCH absolute grant for a UE shall be transmitted over one E-AGCH.

5B.4.14.1 E-AGCH Spreading

The E-AGCH shall use spreading factor SF = 32, as described in 5B.3.1.1.

5B.4.14.2 E-AGCH Burst Types

Burst types 1 and 2 as described in subclause 5B.3.2 can be used for E-AGCH. TPC shall be transmitted on E-AGCH whereas TFCI shall not be transmitted.

5B.4.14.3 E-AGCH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the E-AGCH.

5B.4.15.4 E-AGCH timeslot formats

The E-AGCH uses the timeslot formats of Table 20. These augment downlink slot formats 0...19 of table 8AF, see subclause 5B.3.2.6.1.

Slot Midamble Bits/slot N_{TPC} (bits) $N_{\text{data/data}}$ N_{TFCI code word} N_{Data/Slot} N_{data/data} **Format** length (bits) (bits) field (1) field (2) # (chips) (bits) (bits) 244 20 32 1024 0 2 242 122 120 21 32 512 0 2 276 274 138 136

Table 20: Time slot formats for E-AGCH

5B.4.15 E-DCH Hybrid ARQ Acknowledgement Indicator Channel (E-HICH)

The E-DCH HARQ Acknowledgement indicator channel (E-HICH) is defined in terms of a SF32 downlink physical channel and a signature sequence. The E-HICH carries the uplink E-DCH hybrid ARQ acknowledgement indicator. Figure 18APD illustrates the structure of the E-HICH.

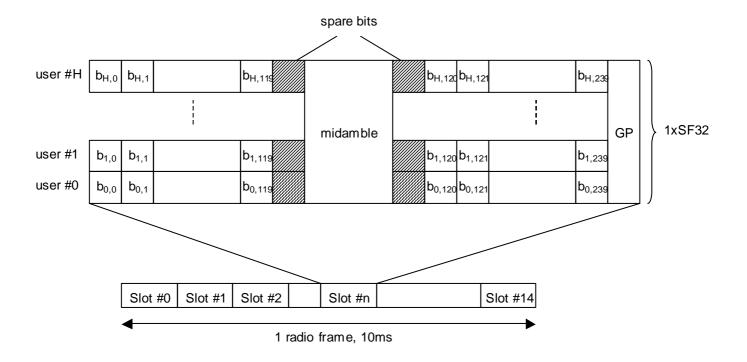


Figure 18APD - E-HICH Structure

A single channelisation code may carry one or multiple signature sequences. Each signature sequence conveys a HARQ acknowledgement indicator. A maximum of one indicator may be transmitted to a UE. Each acknowledgement indicator is coded to form a signature sequence of 240 bits $(b_0, b_1, \ldots, b_{239})$ as defined in [7] and is transmitted within a single E-HICH timeslot. The E-HICH also contains U spare bit locations, where U=4 for burst type 1 and U=36 for burst type 2. The spare bit values are not defined.

5B.4.15.1 E-HICH Spreading

Signature sequences (including spare bits inserted) that share the same channelisation code are combined and spread using spreading factor SF=32 as described in [8].

5B.4.15.2 E-HICH Burst Types

Burst types 1 and 2 as described in subclause 5B.3.2 can be used for E-HICH. Neither TFCI nor TPC shall be transmitted on the E-HICH.

5B.4.15.3 E-HICH Training Sequences

The training sequences as described in subclause 5B.3.3 are used for the E-HICH.

5B.5 Transmit Diversity for DL Physical Channels

Support for transmit diversity is the same as that for the 3.84 Mcps TDD option cf. [5.4 Transmit Diversity]..

5B.6 Beacon characteristics of physical channels

For the purpose of measurements, common physical channels that are allocated to particular locations (time slot, code) shall have particular physical characteristics, called beacon characteristics. Physical channels with beacon characteristics are called beacon channels. The locations of the beacon channels are called beacon locations. The ensemble of beacon channels shall provide the beacon function, i.e. a reference power level at the beacon locations, regularly existing in each radio frame. Thus, beacon channels must be present in each radio frame, the only exception is

when idle periods are used to support time difference measurements for location services [9]. Then it may be possible that the beacon channels occur in the same frame and time slot as the idle periods. In this case, the beacon channels will not be transmitted in that particular frame and time slot.

5B.6.1 Location of beacon channels

The beacon locations are determined by the SCH and depend on the SCH allocation case, see subclause 5B.4.4:

- Case 1) The beacon function shall be provided by the physical channels that are allocated to channelisation code $C_{Q=32}^{(k=1)}$ and to TS#k, k=0,...,14.
- Case 2) The beacon function shall be provided by the physical channels that are allocated to channelisation code $C_{O=32}^{(k=1)}$ and to TS#k and TS#k+8, k=0,...,6.

Note that by this definition the P-CCPCH always has beacon characteristics.

5B.6.2 Physical characteristics of beacon channels

The beacon channels shall have the following physical characteristics. They:

- are transmitted with reference power;
- are transmitted without beamforming;
- use burst type 1 or burst type 4 when MBSFN is applied to beacon channels;
- use midamble m⁽¹⁾ and m⁽²⁾ exclusively in this time slot; and
- midambles m⁽⁹⁾ and m⁽¹⁰⁾ are always left unused in this time slot, if 16 midambles are allowed in that cell.

Note that in the time slot where the P-CCPCH is transmitted only the midambles $m^{(1)}$ to $m^{(8)}$ shall be used, see 5B.7.1. Thus, midambles $m^{(9)}$ and $m^{(10)}$ are always left unused in this time slot.

Note that when MBSFN is applied to beacon channels there is a single midamble and hence midamble $m^{(1)}$ is exclusively used in the timeslot.

The reference power corresponds to the sum of the power allocated to both midambles $m^{(1)}$ and $m^{(2)}$. Two possibilities exist:

- If SCTD antenna diversity is not applied to beacon channels all the reference power of any beacon channel is allocated to m⁽¹⁾.
- If SCTD antenna diversity is applied to beacon channels, for any beacon channel midambles $m^{(1)}$ and $m^{(2)}$ are each allocated half of the reference power.

5B.7 Midamble Allocation for Physical Channels

Midamble allocation for physical channels is identical to 3.84Mcps TDD [section 5.6]. The association between midambles and channelisation codes is given in Annex AB.3.

5B.8 Midamble Transmit Power

There shall be no offset between the sum of the powers allocated to all midambles in a timeslot and the sum of the powers allocated to the data symbol fields. The transmit power within a timeslot is hence constant.

The midamble transmit power of beacon channels is equal to the reference power. If SCTD is used for beacon channels, the reference power is equally divided between the midambles $m^{(1)}$ and $m^{(2)}$.

The midamble transmit power of all other physical channels depends on the midamble allocation scheme used. The following rules apply

- In case of Default Midamble Allocation, every midamble is transmitted with the same power as the associated codes.
- In case of Common Midamble Allocation in the downlink, the transmit power of this common midamble is such that there is no power offset between the data parts and the midamble part of the overall transmit signal within one time slot.
- In case of UE Specific Midamble Allocation, the transmit power of the UE specific midamble is such that there is no power offset between the data parts and the midamble part of every user within one time slot.

The following figure 18AQ depicts the midamble powers for the different channel types and midamble allocation schemes.

Note 1: In figure 18AQ, the codes c(1) to c(32) represent the set of usable codes and not the set of used codes.

Note 2: The common midamble allocation and the midamble allocation by higher layers are not applicable in those beacon time slots, in which the P-CCPCH is located, see section 5B.7.

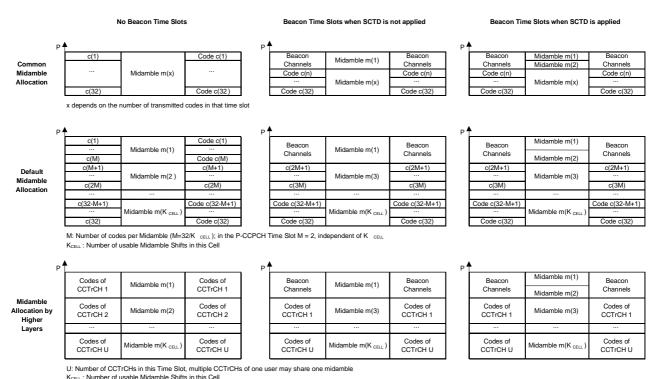


Figure 18AQ: Midamble powers for the different midamble allocation schemes

6 Mapping of transport channels to physical channels for the 3.84 Mcps option

This clause describes the way in which transport channels are mapped onto physical resources, see figure 19. Subclauses 6.1 and 6.2 do not apply to 3.84 Mcps MBSFN IMB. Mappings between transport channels and physical resources for 3.84 Mcps MBSFN IMB are described in sub-clause 6.3.

DCH	Physical Channels Dedicated Physical Channel (DPCH)
BCH	Primary Common Control Physical Channel (P-CCPCH)
FACHPCH	Secondary Common Control Physical Channel (S-CCPCH)
RACH	Physical Random Access Channel (PRACH)
USCH	Physical Uplink Shared Channel (PUSCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
	Paging Indicator Channel (PICH)
	MBMS Indication Channel (MICH)
	Synchronisation Channel (SCH)
	Physical Node B Synchronisation Channel (PNBSCH)
HS-DSCH	 High Speed Physical Downlink Shared Channel (HS-PDSCH)
	Shared Control Channel for HS-DSCH (HS-SCCH)
	Shared Information Channel for HS-DSCH (HS-SICH)
E-DCH	E-DCH Physical Uplink Channel (E-PUCH)
	E-DCH Random Access Uplink Control Channel (E-RUCCH)
	E-DCH Absolute Grant Channel (E-AGCH)
	E-DCH Hybrid ARQ Indicator Channel (E-HICH)

Figure 19: Transport channel to physical channel mapping

6.1 Dedicated Transport Channels

6.1.1 The Dedicated Channel (DCH)

A dedicated transport channel is mapped onto one or more physical channels. An interleaving period is associated with each allocation. The frame is subdivided into slots that are available for uplink and downlink information transfer. The mapping of transport blocks on physical channels is described in TS 25.222 ("multiplexing and channel coding").

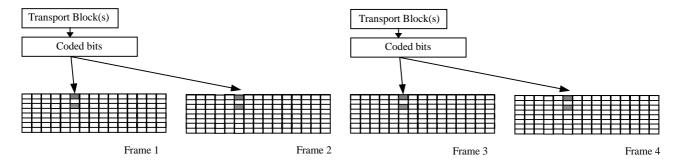


Figure 20: Mapping of Transport Blocks onto the physical bearer

For NRT packet data services, shared channels (USCH and DSCH) can be used to allow efficient allocations for a short period of time.

6.1.2 The Enhanced Uplink Dedicated Channel (E-DCH)

The enhanced uplink dedicated channel is mapped on one or several E-PUCH, see subclause 5.3.13.

6.1.2.1 E-DCH/E-AGCH Association and Timing

The E-DCH is always associated with a number of E-DCH Absolute Grant Channels (E-AGCH) and one hybrid ARQ indicator channel (E-HICH). A grant of E-DCH transmission resources may be transmitted to the UE on any one of the associated E-AGCH. All relevant Layer 1 control information related to an E-DCH TTI is transmitted in the associated E-AGCH and E-HICH.

The E-DCH related time slot information that is carried on the E-AGCH refers to the next valid E-PUCH allocation, which is given by the following limitation: There shall be an offset of $n_{E-AGCH} \ge 6$ time slots between the E-AGCH carrying the E-DCH related information and the first indicated E-PUCH (in time) for a given UE. The E-DCH related time slot information shall not refer to two subsequent radio frames but shall always refer to either the same or the following radio frame, as illustrated in figure 20a. Note that the figure only shows the E-AGCH that carries the E-DCH related information for the given UE.

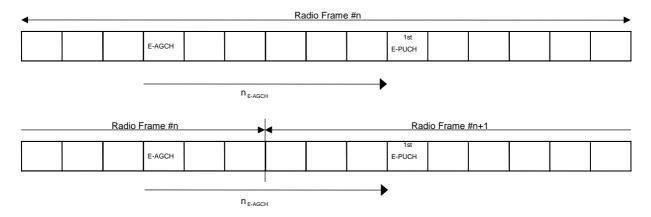


Figure 20a: Timing for E-AGCH and E-DCH for different radio frame configurations for a given UE

6.1.2.2 E-DCH/E-HICH Association and Timing

All E-DCH operations within the cell are associated with the same E-HICH channelisation code. A single E-HICH channelisation code exists in the cell per E-DCH TTI (10ms). For a given UE, a HARQ acknowledgement indicator is synchronously linked with the E-DCH TTI transmission to which it relates. There is thus a one-to-one association between an E-DCH TTI transmission and its respective HARQ acknowledgment indicator on the associated E-HICH.

The associated E-HICH shall reside on the first instance of the E-HICH channelisation code to occur after n_{E-HICH} timeslots have elapsed since the start of the last E-PUCH of the corresponding E-DCH TTI (see examples of figure 20b). The value of n_{E-HICH} is configurable by higher layers within the range 4 to 44 timeslots.

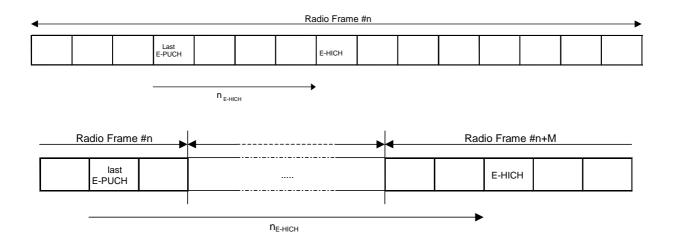


Figure 20b: Timing for E-DCH and E-HICH for a given UE

$$r = 16(t_0 - 1) + (q_0 - 1)\frac{16}{Q_0}$$

- where:
 - o t₀ is the bit position (1...n_{TRRI}) of the first active timeslot in the timeslot resource related information bitmap (see [7]) on E-AGCH and where bit position 1 corresponds to the lowest-numbered timeslot
 - o q_0 is the allocated channelisation code index $(1,2,3,...Q_0)$
 - \circ Q_0 is the spreading factor of the allocated uplink channelisation code

6.2 Common Transport Channels

6.2.1 The Broadcast Channel (BCH)

The BCH is mapped onto the P-CCPCH. The secondary SCH codes indicate in which timeslot a mobile can find the P-CCPCH containing BCH.

6.2.2 The Paging Channel (PCH)

The PCH is mapped onto one or several S-CCPCHs so that capacity can be matched to requirements. The location of the PCH is indicated on the BCH. It is always transmitted at a reference power level.

To allow an efficient DRX, the PCH is divided into PCH blocks, each of which comprising N_{PCH} paging sub-channels. N_{PCH} is configured by higher layers. Each paging sub-channel is mapped onto 2 consecutive PCH frames within one PCH block. Layer 3 information to a particular UE is transmitted only in the paging sub-channel, that is assigned to the

UE by higher layers, see [15]. The assignment of UEs to paging sub-channels is independent of the assignment of UEs to page indicators.

6.2.2.1 PCH/PICH Association

As depicted in figure 21, a paging block consists of one PICH block and one PCH block. If a paging indicator in a certain PICH block is set to '1' it is an indication that UEs associated with this paging indicator shall read their corresponding paging sub-channel within the same paging block. The value $N_{GAP}>0$ of frames between the end of the PICH block and the beginning of the PCH block is configured by higher layers.

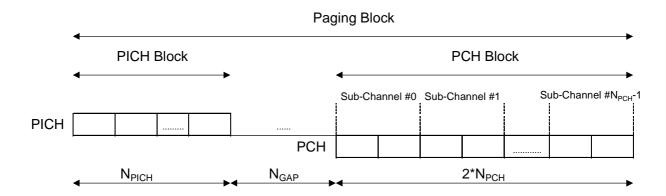


Figure 21: Paging Sub-Channels and Association of PICH and PCH blocks

6.2.3 The Forward Channel (FACH)

The FACH is mapped onto one or several S-CCPCHs. The location of the FACH is indicated on the BCH and both, capacity and location can be changed, if required. FACH may or may not be power controlled.

6.2.4 The Random Access Channel (RACH)

The RACH has intraslot interleaving only and is mapped onto PRACH. The same slot may be used for PRACH by more than one cell. Multiple transmissions using different spreading codes may be received in parallel. More than one slot per frame may be administered for the PRACH. The location of slots allocated to PRACH is broadcast on the BCH. The PRACH uses open loop power control. The details of the employed open loop power control algorithm may be different from the corresponding algorithm on other channels.

6.2.5 The Uplink Shared Channel (USCH)

The uplink shared channel is mapped on one or several PUSCH, see subclause 5.3.5.

6.2.6 The Downlink Shared Channel (DSCH)

The downlink shared channel is mapped on one or several PDSCH, see subclause 5.3.6.

6.2.7 The High Speed Downlink Shared Channel (HS-DSCH)

The high speed downlink shared channel is mapped on one or several HS-PDSCH, see subclause 5.3.9.

6.2.7.1 HS-DSCH/HS-SCCH Association and Timing

The HS-DSCH is always associated with a number of High Speed Shared Control Channels (HS-SCCH). The number of HS-SCCHs that are associated with an HS-DSCH for one UE can range from a minimum of one HS-SCCH (M=1) to a maximum of four HS-SCCH (M=4). All relevant Layer 1 control information is transmitted in the associated HS-SCCH i.e. the HS-PDSCH does not carry any Layer 1 control information.

The HS-DSCH related time slot information that is carried on the HS-SCCH refers to the next valid HS-PDSCH allocation, which is given by the following limitation: There shall be an offset of $n_{\text{HS-SCCH}} \ge 4$ time slots between the HS-SCCH carrying the HS-DSCH related information and the first indicated HS-PDSCH (in time) for a given UE. The HS-DSCH related time slot information shall not refer to two subsequent radio frames but shall always refer to either the same or the following radio frame, as illustrated in figure 21A. Note that the figure only shows the HS-SCCH that carries the HS-DSCH related information for the given UE.

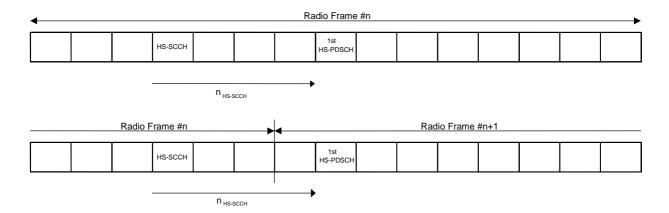


Figure 21A: Timing for HS-SCCH and HS-DSCH for different radio frame configurations for a given UE

6.2.7.2 HS-SCCH/HS-DSCH/HS-SICH Association and Timing

The HS-SCCH is always associated with one HS-SICH. The association between the HS-SCCH in DL and HS-SICH in UL shall be pre-defined by higher layers and is common for all UEs.

The UE shall transmit the HS-DSCH related ACK / NACK on the next available associated HS-SICH with the following limitation: There shall be an offset of $n_{\text{HS-SICH}} \geq 17$ time slots between the last allocated HS-PDSCH (in time) and the HS-SICH for the given UE. Hence, the HS-SICH transmission shall be made in the next or next but one radio frame, following the HS-DSCH transmission, as illustrated in figure 21B. Note that the figure only shows the HS-SICH that carries the HS-DSCH related ACK / NACK for the given UE.

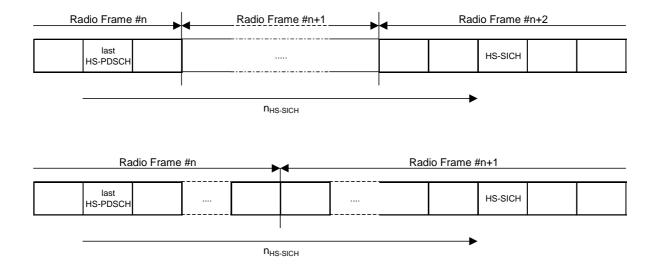


Figure 21B: Timing for HS-DSCH and HS-SICH for different radio frame configurations for a given UE

6.3 Mapping of TrCHs for the 3.84 Mcps MBSFN IMB option

The following mappings are supported:

- BCH mapped to P-CCPCH.
- FACH mapped to S-CCPCH
- MICH (no transport channel is mapped to MICH)

7 Mapping of transport channels to physical channels for the 1.28 Mcps option

This clause describes the way in which the transport channels are mapped onto physical resources, see figure 22.

Transport channels	Physical channels
DCH	Dedicated Physical Channel (DPCH)
BCH	Primary Common Control Physical Channels (P-CCPCH)
PCH	Secondary Common Control Physical Channels(S-CCPCH)
FACH	Secondary Common Control Physical Channels(S-CCPCH)
	PICH
	MICH
	PLCCH
RACH	Physical Random Access Channel (PRACH)
USCH	Physical Uplink Shared Channel (PUSCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
	Down link Pilot Channel (DwPCH)
	Up link Pilot Channel (UpPCH)
	FPACH
HS-DSCH	High Speed Physical Downlink Shared Channel (HS-PDSCH)
	Shared Control Channel for HS-DSCH (HS-SCCH)
	Shared Information Channel for HS-DSCH (HS-SICH)
E-DCH	E-DCH Physical Uplink Channel (E-PUCH)
	E-DCH Uplink Control Physical Channel (E-UCCH)
	E-DCH Random Access Uplink Control Channel (E-RUCCH)
	E-DCH Absolute Grant Channel (E-AGCH)
	E-DCH Hybrid ARQ Indicator Channel (E-HICH)

Figure 22: Transport channel to physical channel mapping for 1.28Mcps TDD

7.1 Dedicated Transport Channels

7.1.1 The Dedicated Channel (DCH)

The mapping of transport blocks to physical bearers is in principle the same as in 3.84 Mcps TDD but due to the subframe structure the coded bits are mapped onto each of the subframes within the given TTI.

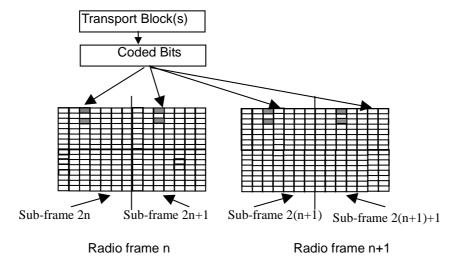


Figure 23: Mapping of Transport Blocks onto the physical bearer (TTI= 20ms)

7.1.2 The Enhanced Uplink Dedicated Channel (E-DCH)

The enhanced uplink dedicated channel is mapped on one or several E-PUCH, see subclause 5A.3.14.

For multi-carrier E-DCH transmission, the E-DCH on one carrier is always associated with a number of E-AGCH and up to four E-HICHs on the same carrier. The E-DCH, E-AGCH and E-HICH on the same carrier obey the following timing relationships.

7.1.2.1 E-DCH/E-AGCH Association and Timing

The E-DCH is always associated with a number of E-DCH Absolute Grant Channels (E-AGCH) and up to four hybrid ARQ Indicator Channel (E-HICH). A grant of E-DCH transmission resources may be transmitted to the UE on any one of the associated E-AGCH. All relevant Layer 1 control information related to an E-DCH TTI is transmitted in the associated E-AGCH and E-HICH.

The E-DCH related timeslot information that is carried on the E-AGCH refers to the next valid E-PUCH allocation, which is given by the following limitation: There shall be an offset of $n_{E\text{-AGCH}} \ge 7$ time slots between the E-AGCH carrying the E-DCH related information and the first indicated E-PUCH (in time) for a given UE. DwPTS and UpPTS shall not be taken into account in this limitation as illustrated in figure 23A. Note that the figure only shows the E-AGCH that carries the E-DCH related information for the given UE and that DwPTS and UpPTS are not considered in this figure.

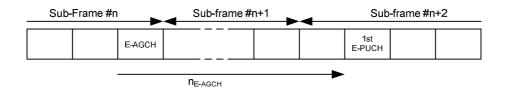


Figure 23A: Timing for E-AGCH and E-PUCH for different radio frame configurations for a given UE

When E-AGCH is allocated in TS0, the timing between E-AGCH and the associated E-PUCH is defined as: E-AGCH is sent in the n-th sub-frame while the E-PUCH is sent in the (n+2)-th sub-frame.

For the semi-persistent E-DCH resources, the timing between E-AGCH and the first E-PUCH can also use the same limitation: There shall be an offset of $n_{E-AGCH} \ge 7$ time slots between the E-AGCH carrying the semi-persistent E-DCH related information and the first indicated semi-persistent E-PUCH (in time) for a given UE. Once the semi-persistent resources are assigned to UE, UE can use these resources continuously until the semi-persistent resources have been released or reconfigured by Node B or RNC.

7.1.2.2 E-DCH/E-HICH Association and Timing

For a given UE, a HARQ acknowledgement indicator (E-HICH) is synchronously linked with the E-DCH TTI transmission to which it relates.

The associated E-HICH shall reside on the first E-HICH instance of the E-HICH channelisation code to occur after n_{E-HICH} timeslots have elapsed since the start of the last E-PUCH of the corresponding E-DCH TTI (see examples of figure 23B). DwPTS and UpPTS are not considered in the figure. The value of n_{E-HICH} is configurable by higher layers within the range 4 to 15 timeslots. DwPTS and UpPTS shall not be taken into account in this limitation.

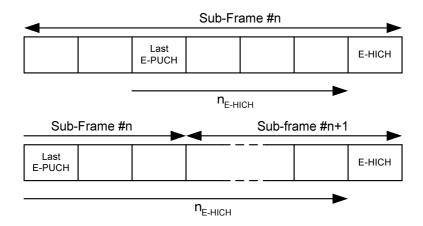


Figure 23B: Timing for E-DCH and E-HICH for a given UE

7.2 Common Transport Channels

7.2.1 The Broadcast Channel (BCH)

There are two P-CCPCHs, P-CCPCH 1 and P-CCPCH 2 which are mapped onto timeslot#0 using the channelisation codes $c_{Q=16}^{(k=1)}$ and $c_{Q=16}^{(k=2)}$ with spreading factor 16. The BCH is mapped onto the P-CCPCH1+P-CCPCH2.

The position of the P-CCPCHs is indicated by the relative phases of the bursts in the DwPTS with respect to the P-CCPCHs midamble sequences, see [8]. One special combination of the phase differences of the burst in the DwPTS with respect to the P-CCPCH midamble indicates the position of the P-CCPCH in the multi-frame and the start position of the interleaving period.

7.2.2 The Paging Channel (PCH)

If the PICH is associated with an S-CCPCH to which a PCH transport channel is mapped, the mapping of Paging Channels onto S-CCPCHs and the association between PCHs and Paging Indicator Channels is the same as in the 3.84 Mcps TDD option, cf. 6.2.2 'The paging Channel' and 6.2.2.1 'PCH/PICH Association' respectively.

7.2.3 The Forward Channel (FACH)

The FACH is mapped onto one or several S-CCPCHs. The location of the FACH is indicated on the BCH and both, capacity and location can be changed, if required. FACH may or may not be power controlled.

7.2.4 The Random Access Channel (RACH)

The RACH is mapped onto PRACH. More than one slot per frame may be administered for the PRACH. The location of slots allocated to PRACH is broadcast on the BCH. The uplink sync codes (SYNC-UL sequences) used by the UEs for UL synchronisation have a well known association with the P-RACHs, as broadcast on the BCH. On the PRACH, both power control and uplink synchronisation control are used.

7.2.5 The Uplink Shared Channel (USCH)

The uplink shared channel is mapped onto one or several PUSCH, see subclause 5A.3.6 'Physical Uplink Shared Channel (PUSCH)'

7.2.6 The Downlink Shared Channel (DSCH)

The downlink shared channel is mapped onto one or several PDSCH, see subclause 5A.3.7 'Physical Downlink Shared Channel (PDSCH)'

7.2.7 The High Speed Downlink Shared Channel (HS-DSCH)

The high speed downlink shared channel is mapped on one or several HS-PDSCH, see subclause 5A.3.9.

7.2.7.1 HS-DSCH/HS-SCCH Association and Timing

The HS-DSCH can be associated with a number of High Speed Shared Control Channels (HS-SCCH). In a multi-frequency HS-DSCH cell, HS-DSCH may be mapped on HS-PDSCHs on one or more carrier in CELL_DCH state and on only one carrier in CELL_FACH, CELL_PCH and URA_PCH state for UE supporting multi-carrier HS-DSCH reception configured by higher layers. HS-DSCH transmission on each carrier is associated with a HS-SCCH subset and the number of HS-SCCHs in one HS-SCCH subset can range from a minimum of one HS-SCCH (M=1) to a maximum of four HS-SCCH (M=4). All the HS-SCCH subsets for one UE constitute a HS-SCCH set. For UE not supporting multi-carrier HS-DSCH reception, only one HS-SCCH subset is allocated by higher layers. All relevant Layer 1 control information is transmitted in the associated HS-SCCH i.e. the HS-PDSCH does not carry any Layer 1 control information.

The HS-DSCH related time slot information that is carried on the HS-SCCH refers to the next valid HS-PDSCH allocation, which is given by the following limitation: The indicated HS-PDSCH shall be on the sub-frame next to the HS-SCCH carrying the HS-DSCH related information. The HS-DSCH related time slot information shall not refer to two subsequent sub-frames but shall always refer to the following sub-frame, as illustrated in figure 24. Note that the figure only shows the HS-SCCH that carries the HS-DSCH related information for the given UE and that DwPTS and UpPTS are not considered in this figure. In case of multi-carrier HS-DSCH reception, the timing for HS-DSCH transmission on each carrier and its associated HS-SCCH applies the same rule.

When the indicated HS-PDSCH includes TS0, the timing between HS-SCCH and HS-PDSCH including TS0 is defined as: HS-SCCH is sent in the n-th sub-frame while HS-PDSCH is sent in the (n+1)-th sub-frame, where the included TS0 is sent in TS0 of the (n+2)-th sub-frame.

For the semi-persistent HS-DSCH resources, the timing between HS-SCCH and the first HS-PDSCH applies the rule that, if the HS-SCCH is transmitted in subframe N, then the first HS-PDSCH is transmitted in subframe N+2, as illustrated in figure 24A. Once the semi-persistent resources are assigned to UE, UE can use these resources continuously until the semi-persistent resources have been released or reconfigured by Node B or RNC.



Figure 24: Timing for HS-SCCH and HS-DSCH for different radio frame configurations for a given UE



Figure 24A: Timing for HS-SCCH and first semi-persistent HS-DSCH for different radio frame configurations for a given UE

7.2.7.2 HS-SCCH/HS-DSCH/HS-SICH Association and Timing

The HS-SCCH is always associated with one HS-SICH, carrying the ACK/NACK and Channel Quality information (CQI). The association between the HS-SCCH in DL and HS-SICH in UL shall be pre-defined by higher layers and is common for all UEs. For the HS-DSCH semi-persistent scheduling operation, the associated HS-SICH to the HS-DSCH is conveyed by HS-SICH Indicator on HS-SCCH.

The UE in CELL_DCH state and in CELL_FACH state with a dedicated UE identity shall transmit the HS-DSCH related ACK / NACK on the next available associated HS-SICH with the following limitation: There shall be an offset of $n_{\text{HS-SICH}} \geq 9$ time slots between the last allocated HS-PDSCH (in time) and the HS-SICH for the given UE. DwPTS and UpPTS shall not be taken into account in this limitation. Hence, the HS-SICH transmission shall always be made in the next but one sub-frame, following the HS-DSCH transmission, as illustrated in figure 25. Note that the figure only shows the HS-SICH that carries the HS-DSCH related ACK / NACK for the given UE and that DwPTS and UpPTS are not considered in this figure. In case of multi-carrier HS-DSCH reception, the timing for HS-DSCH transmission on each carrier and its related HS-SICH applies the same rule. For the HS-SCCH order which is an uplink synchronization establishment order for UEs in CELL FACH and CELL PCH state, the UE shall not transmit associated HS-SICH.

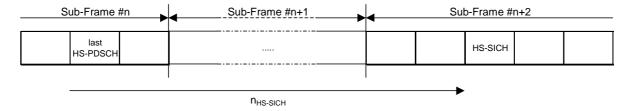


Figure 25: Timing for HS-DSCH and HS-SICH for different radio frame configurations for a given UE

When the indicated HS-PDSCH includes TS0, the timing between HS-PDSCH including TS0 and HS-SICH is defined as: HS-PDSCH is sent in the n-th sub-frame while HS-SICH is sent in the (n+2)-th sub-frame, where the included TS0 is sent in TS0 of the (n+1)-th sub-frame and there shall be an offset of $n_{\text{HS-SICH}} \ge 9$ time slots between the last allocated HS-PDSCH (in time) and the HS-SICH.

There shall be an associated HS-SICH for the HS-SCCH command for allocation or release of the semi-persistent HS-PDSCH resources and HS-SCCH command for activation or deactivation of DRX. There shall also be an associated HS-SICH for HS-SCCH type 1 or HS-SCCH type 4 or HS-SCCH type 8 with transport block size information set to all zeros. There is no associated HS-PDSCH in these cases. The timing between the HS-SCCH and the HS-SICH for the given UE as illustrated in figure 25A. The UE shall transmit the HS-SCCH related ACK on the next available associated HS-SICH with the following limitation: There shall be an offset of $n'_{\text{HS-SICH}} \ge 14$ time slots between the HS-SCCH (in time) and the HS-SICH for the given UE. DwPTS and UpPTS shall not be taken into account in this limitation.

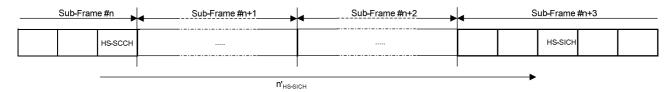


Figure 25A: Timing for HS-SCCH and HS-SICH for different radio frame configurations for a given UE

When HS-SCCH is allocated in TS0, the timing between HS-SCCH for the HS-SCCH command and the associated HS-SICH is defined as: HS-SCCH is sent in the n-th sub-frame while HS-SICH is sent in the (n+3)-th sub-frame.

7.2.7.3 PICH/HS-SCCH/HS-DSCH Association and Timing

When the UE in CELL_PCH state with a dedicated UE identity detects the PICH identifying DCCH/DTCH/BCCH transmission, the UE shall receive the corresponding HS-SCCH subframes. The association and timing between PICH and HS-SCCH is depicted in figure 25A. If a paging indicator in a certain PICH block is set to '1' it is an indication that UEs associated with this paging indicator shall read their corresponding HS-SCCH in the M frames where M is Reception window size configured by higher layers. The value $N_{GAP}>0$ of frames between the end of the PICH block and the beginning of the HS-SCCH is configured by higher layers. Note: for DCCH/DTCH transmission, HS-SCCH shall be HS-SCCH order; while for BCCH transmission, the association and timing between HS-SCCH and HS-DSCH is the same as described in subclause 7.2.7.1.

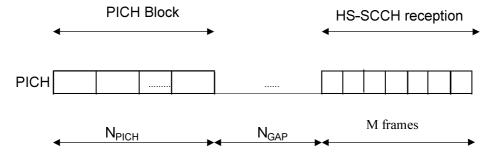


Figure 25A: Timing for PICH and HS-SCCH for different radio frame configurations for a given UE

7.2.7.4 PICH/ HS-DSCH Association and Timing

When the UE in URA_PCH or CELL_PCH state without a dedicated UE identity detects the PICH identifying PCCH transmission, the UE shall receive the corresponding HS-DSCH TTIs. The association and timing between PICH and HS-DSCH is depicted in figure 25B. If a paging indicator in a certain PICH block is set to '1' it is an indication that UEs associated with this paging indicator shall read their corresponding sub-channel and consider that paging message is retransmitted in 2*m subframes where m denotes Paging Sub-Channel Size configured by higher layers which is the number of frames that each paging sub-channel occupies. The value $N_{GAP}>0$ of frames between the end of the PICH block and the beginning of the HS-DSCH is configured by higher layers.

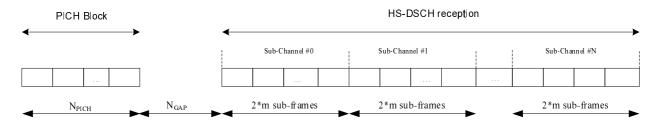


Figure 25B: Timing for PICH and HS-DSCH for different radio frame configurations for a given UE

8 Mapping of transport channels to physical channels for the 7.68 Mcps option

This clause describes the way in which transport channels are mapped onto physical resources, see figure 26.

DCH	Physical Channels Dedicated Physical Channel (DPCH)
BCH	Primary Common Control Physical Channel (P-CCPCH)
PCH	. Secondary Common Control Physical Channel (S-CCPCH)
RACH	Physical Random Access Channel (PRACH)
USCH	Physical Uplink Shared Channel (PUSCH)
DSCH	Physical Downlink Shared Channel (PDSCH)
	Paging Indicator Channel (PICH)
	MBMS Indication Channel (MICH)
	Synchronisation Channel (SCH)
HS-DSCH	High Speed Physical Downlink Shared Channel (HS-PDSCH)
	Shared Control Channel for HS-DSCH (HS-SCCH)
	Shared Information Channel for HS-DSCH (HS-SICH)
E-DCH	. E-DCH Physical Uplink Channel (E-PUCH)
	E-DCH Random Access Uplink Control Channel (E-RUCCH)
	E-DCH Absolute Grant Channel (E-AGCH)
	E-DCH Hybrid ARQ Indicator Channel (E-HICH)

Figure 26: Transport channel to physical channel mapping

8.1 Dedicated Transport Channels

8.1.1 The Dedicated Channel (DCH)

Mapping of dedicated transport channels to physical channels is identical to 3.84Mcps TDD cf. [6.1 Dedicated Transport Channels].

8.1.2 The Enhanced Uplink Dedicated Channel (E-DCH)

The enhanced uplink dedicated channel is mapped on one or several E-PUCH, see subclause 5B.4.12.

8.1.2.1 E-DCH/E-AGCH Association and Timing

The E-DCH is always associated with a number of E-DCH Absolute Grant Channels (E-AGCH) and with one or two hybrid ARQ indicator channels (E-HICH). A grant of E-DCH transmission resources may be transmitted to the UE on

any one of the associated E-AGCH. All relevant Layer 1 control information related to an E-DCH TTI is transmitted in the associated E-AGCH and one of the E-HICHs.

The E-DCH related time slot information that is carried on the E-AGCH refers to the next valid E-PUCH allocation, which is given by the following limitation: There shall be an offset of $n_{E-AGCH} \ge 6$ time slots between the E-AGCH carrying the E-DCH related information and the first indicated E-PUCH (in time) for a given UE. The E-DCH related time slot information shall not refer to two subsequent radio frames but shall always refer to either the same or the following radio frame, as illustrated in figure 27. Note that the figure only shows the E-AGCH that carries the E-DCH related information for the given UE.

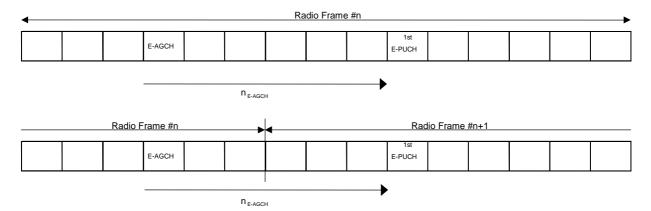


Figure 27: Timing for E-AGCH and E-DCH for different radio frame configurations for a given UE

8.1.2.2 E-DCH/E-HICH Association and Timing

E-DCH operations within the cell are associated with one or two channelisation codes carrying E-HICH (E-HICH₁ and E-HICH₂). If the number of timeslots configured for E-DCH use is 7 or more (this corresponds to the length of the timeslot resource related information field on E-AGCH – see [7]), both E-HICH₁ and E-HICH₂ channelisation codes shall be configured by higher layers, otherwise only the channelisation code E-HICH₁ is configured.

A single instance of E-HICH $_1$ (and E-HICH $_2$ if configured) channelisation codes exist in the cell per E-DCH TTI (10ms). For a given UE, a HARQ acknowledgement indicator is synchronously linked with the E-DCH TTI transmission to which it relates. There is thus a one-to-one association between an E-DCH TTI transmission and its respective HARQ acknowledgment indicator on one of the associated E-HICHs.

For each channelisation code carrying E-HICH, the associated instance shall be the first instance of that channelisation code to occur after $n_{E\text{-HICH}}$ timeslots have elapsed since the start of the last E-PUCH of the corresponding E-DCH TTI (see examples of figure 28). The value of $n_{E\text{-HICH}}$ is configurable by higher layers within the range 4 to 44 timeslots.

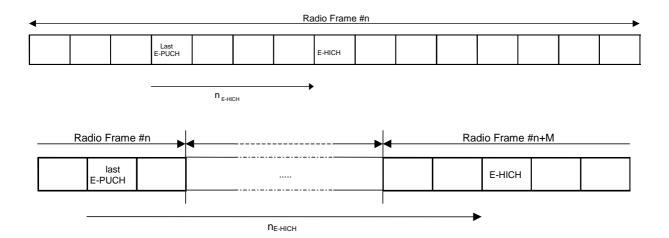


Figure 28: Timing for E-DCH and E-HICH for a given UE

The HARQ acknowledgement indicator associated with an E-DCH transmission is transmitted using one of 240 signature sequences carried by one of the associated E-HICH channelisation codes. Which signature sequence r = 0, t = 0

- o t_0 is the bit position $(1...n_{TRRI})$ of the first active timeslot in the timeslot resource related information bitmap (see [7]) on E-AGCH and where bit position 1 corresponds to the lowest-numbered timeslot
- o q_0 is the allocated channelisation code index $(1,2,3,...Q_0)$
- \circ Q₀ is the spreading factor of the allocated uplink channelisation code

The value r' is first calculated as:

$$r' = 32(t_0 - 1) + (q_0 - 1)\frac{32}{Q_0}$$

Then:

- if $r' \le 239$, r = r' and channelisation code E-HICH₁ is used
- if r'>239, r=(r'-240) and channelisation code E-HICH₂ is used.

8.2 Common Transport Channels

8.2.1 The Broadcast Channel (BCH)

The mapping of the broadcast channel (BCH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.1 The Broadcast Channel (BCH)].

8.2.2 The Paging Channel (PCH)

The mapping of the paging channel (PCH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.2 The Paging Channel (PCH)].

8.2.3 The Forward Channel (FACH)

The mapping of the forward access channel (FACH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.3 The Forward Access Channel (FACH)].

8.2.4 The Random Access Channel (RACH)

The mapping of the random access channel (RACH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.4 The Random Access Channel (RACH)].

8.2.5 The Uplink Shared Channel (USCH)

The mapping of the uplink shared channel (USCH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.5 The Uplink Shared Channel (USCH)].

8.2.6 The Downlink Shared Channel (DSCH)

The mapping of the downlink shared channel (DSCH) to physical channels is identical to 3.84Mcps TDD cf. [6.2.6 The Downlink Shared Channel (DSCH)].

8.2.7 The High Speed Downlink Shared Channel (HS-DSCH)

The high speed downlink shared channel is mapped on one or several HS-PDSCH, see subclause 5B.4.8.

8.2.7.1 HS-DSCH/HS-SCCH Association and Timing

The HS-DSCH/HS-SCCH association and timing is identical to 3.84Mcps TDD cf. [section 6.2.7.1 HS-DSCH/HS-SCCH Association and Timing] with the exception that the number of HS-SCCHs that are associated with an HS-DSCH for one UE can range from a minimum of one HS-SCCH (M=1) to a maximum of eight HS-SCCH (M=8).

8.2.7.2 HS-SCCH/HS-DSCH/HS-SICH Association and Timing

The HS-SCCH/HS-DSCH/HS-SICH association and timing is identical to 3.84Mcps TDD cf. [6.2.7.2 HS-SCCH/HS-DSCH/HS-SICH Association and Timing].

Annex A (normative): Basic Midamble Codes for the 3.84 Mcps option

A.1 Basic Midamble Codes for Burst Type 1 and 3

In the case of burst type 1 or 3 (see subclause 5.2.2) the midamble has a length of Lm=512, which is corresponding to:

K'=8; W=57; P=456.

Depending on the possible delay spread timeslots are configured to use K_{Cell} midambles which are generated from the Basic Midamble Codes (see table A.1)

- for all k=1,2,...,K; K=2K' or
- for k=1,2,...,K', only, or
- for odd $k=1,3,5,..., \le K'$, only.

In the beacon slot #k, where the P-CCPCH is located, the number of midambles K_{Cell} =8 (cf section 5.6.1). In all of the other timeslots that use burst type 1 or 3, K_{Cell} is individually configured from higher layers.

Depending on the cell size midambles for PRACH are generated from the Basic Midamble Codes (see table A.1)

- for k=1,2,...,K' or
- for odd $k=1,3,5,..., \le K'$, only.

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS 25.223.

Table A.1: Basic Midamble Codes $\,m_{_{\rm P}}\,$ according to equation (5) from subclause 5.2.3 for case of burst type 1 and 3

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL0}	8DF65B01E4650910A4BF89992E48F43860B07FE55FA0028E454EDCD1F0A09A6F029668F55427
	253FB8A71E5EF2EF360E539C489584413C6DC4
m _{PL1}	4C63F9BC3FD7B655D5401653BE75E1018DC26D271AADA1CF13FD348386759506270F2F953E9
	3A44468E0A76605EAE8526225903B1201077602
m _{PL2}	8522611FFCAEB55A5F07D966036C852E7B15B893B3ABA9672C327380283D168564B8E1200F0E
	2205AF1BB23A58679899785CFA2A6C131CFDC4
m _{PL3}	F58107E6B777C221999BDE9340E192DC6C31AB8AE85E70AA9BBEB39727435412A5A27C0EF7
	3AB453ED0D28E5B032B94306EC1304736C91E922
m _{PL4}	89670985013DFD2223164B68A63BD58C7867E97316742D3ABD6CBDA4FC4E08C0B0CBE44451
	575C72F887507956BD1F27C466681800B4B016EE
m _{PL5}	FCDEF63500D6745CDB962594AF171740241E982E9210FC238C4DD85541F08C1A010F7B3161A
	7F4DF19BAD916FD308AB1CED2A32538C184E92C
m _{PL6}	DB04CE77A5BA7C0E09B6D3551072B11A7A43B6A355C1D6FDCF725D587874999895748DD098
	32ABC35CEC3008338249612E6FE5005E13B03103
m _{PL7}	D2F61A622D0BA9E448CD29587D398EF8CDC3B6582B6CDD50E9E20BF5FE2B3258041E14D608
	21DC6725132C22D787CD5D497780D4241E3B420D
m _{PL8}	7318524E62D806FA149ECC5435058A2B74111524B84727FE9A7923B4A1F0D8FCD89208F34BE
	E5CADEB90130F9954BB30605A98C11045FF173D
m _{PL9}	8E832B4FA1A11E0BF318E84F54725C8052E0D099EF0AF54BC342BEE44976C9F38DE701623C7
	BF6474DF90D2E2222A4915C8080E7CD3EC84DAC
m _{PL10}	CFA5BAC90780876C417933C43103B55699A8AD51164E590AF9DA6AF0C18804E1F74862F00CE
	7ECC899C85B6ABB0CAD5E50836AD7A39878FE2F
m _{PL11}	AD539094A19858A75458F1B98E286A4F7DC3A117083D04724CBE83F34102817C5531329CDB43
	7FFF712241B644BDF0C1FEC8598A63C2F21BD7
m _{PL12}	BEB8483139529BDE23E42DA6AB8170DD0BFBB30CE28A4502FAF3C8EDA219B9A6D5B849D9C
	9E4451F74E2408EA046061201E0C1D69CF48F3A94
m _{PL13}	C482462CA7846266060D21688BA00B72E1EC84A3D5B7194C8DA39E21A3CE12BF512C8AAB6A
	7079F73C0D3E4F40AC555A4BCC453F1DFE3F6C82

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL14}	9663373935FD5C213AC58C0670206683D579D2526C05B0A81030DDF61A221D8A68EAD8D6F7A
	A0D662C07C6DCD0115A54D39F03F7122B0675AC
m _{PL15}	387397AE5CD3F2B3912C26B8F87CE82CEFEC55507DB08FB0C4CF2FD6858896201ACA726428
	1D0298440DD3481E5E9DDB24C16F30EB7A22948A
m _{PL16}	AFE9266843C892571B6230D808788C63B9065EA3BDFF687B92B8734A8D7099559FEA22C94165
	76D0C087EB4503E87E356471B330182A24A3E6
M _{PL17}	6E6C550A4CB74010F6C3E0328651DF421C456D9A5E8AE9D3946C10189D72B579184552EE3E7
	99970969C870FE8A37B6C4BA890992103486DC0
m _{PL18}	D803CA71B6F99CFB3105D40F4695D61EB0B62E803F79302EE3D2A6BF12EA70D304B181E8B3
	8B3B74F5022B67EB8109808C62532688C563D4BE
m _{PL19}	E599ED48D01772055DBE9D343A4EA5EABE643DA38F06904FC7523B08C4101F021B199AF759A
	00D9AC298881D79413A77470992A75C771492D0
m_{PL20}	9F30AC4162CE5D185953705F3D45F026F38E9B5721AEFE07370214D526A2C4B344B508B57BF
	B2492320C05903C79CBEE08C6E7F218B57E14D6
m _{PL21}	B5971060DA84685B4D042ED0189FAF13C961B2EF61CC164E363B22AAB14AC8AF607906C1C6
	E04F2054C687AA6741A9E70639857DA02B6FFFFA
m_{PL22}	97135FC2226C4B4A5CBA5FCA3732763B87455F73A1148006F3DF214BD4C936D061E04045160
	E2CE33B9CD09D08FDE2A37F4E998322B4401D27
m_{PL23}	4D256D57C861B9791151A78D5299C56D116B6178B2A2D04BB95FB76540AF28341DC6EC4E7E
	D3BF9E508478D9C8F44914805DA82429E1CF320E
m_{PL24}	858EF5C84CE32D18D9ABA110EEA7474CF0CD70254D2928C3F4DFF6BB3A518587CADA190290
	78AC90A8336C8178203BE3289E601F07D089CB64
m_{PL25}	920A8796A511650AEF32F93DD3C39C624E07AE03CE8C96139973F54DCB9803C5164ADB502D
	4FF561564D607037FCD172921F1982B102C3312C
m _{PL26}	485C5DAE76B360A9C56E20B8422EA3E6ACF07CB093B5587CB0E6A5498A4714081EA98DBCD
	B0482B26E0D097C03444473D233BEF3C8E440DEBF
m_{PL27}	565A9D54EA789892B024F97E728E8EE112411942C48BD0C5BC8AA457D8DC9941F0F7424B386
	43FFE6521CD306FBC56FE10F1428D4C245B5606
m_{PL28}	5AEF2C0C2C378179A1AC36242E6B3EDB72C42D3624437674F8D51260C0898C201837CBA14E9
	E23D1EF6451C4ACF27AB031F457A8A1BFD148AE
m_{PL29}	87D8FE685417822A23D925307E6C11081ADAC4702BCCD9BE448E78984D109B50DEF5B7C58B
	C71EA1F0A6826BA8AD1978843E7697F3E416AADA

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL30}	84802B72AF27B5BE724D1FB629E0E627BDB0D9061292562F98350C1D0C9D4B9D8E2BF71123C 82EBB161003AE9829E07244D78F19926F8847A2
m _{PL31}	8CCB5128238BCB088E30972D62792AEF02B9BBDDCAD68C9916C00BF91CBE788B0F03851FA AF88605534FD73436C259D270B1013CB14226F658
m _{PL32}	62F4E6FAC2BF1979CE6854AA2D33534BFB2F946519101A6589131C3640707D40E67ED804AF8 736AD213CAF5935741900061967E8285C27E34C
m _{PL33}	4095E5B4EEAFCDF68A34B267EEA28D8444FA533900F41499E260D2E65C256A52E1DD5861F52 27C98E00687D107233F51A1167BCF72FB184654
M _{PL34}	5630E9A79FCAD303404D9E5A802299162657AAC734761C6E90DA8BCE4F61A763E0BB48D3FE B3F78468C828ABA4828DAD06E0F904CFD40421DC
m _{PL35}	CD12B24C0BCA8AAC1FCBF0500A3BC684A180E863D888F2506B48C68ECF17F76CB285991FB A18EB6397211FAD002F482D57A258CD45DE3FF1A6
m _{PL36}	AFCF2A50877286CD3405442730C45514F082D9EC296B367C0F64F04C4E0007DCA9E50BEED5 C102126E319ACBC64F1729272F2F72C9397029FE
m _{PL37}	18F89EE8589D20882A72A44DCCDF0050F0A3D88DBA6531614973D26905FDF41E3F779FF0648 E8AF1540928511BCF4C25D9C64AF34AC31B8965
m _{PL38}	F890D550F33F032ECDA3A51FED427D634F64EB29AF1332A23CD961258E4BAED040E7B33691 8E250EC272A12816B9EBFFA1E0AE401185F08C10
m _{PL39}	ACE5DD61506047E80FB7D41BD3992DF4D7F18EB46CC145C0E9105428C2F8F299141F5D6669 1904A7DC2513A3B83994ACB1292246B32818FE9D
m _{PL40}	150680FF900C9B46E1E24D54BE2238CB950A934E5CCDE9BC3939EB51CB0AE202B7D339EEC 2018B33A0AB9B63DA5D512D64FB58C0E51A1C82C2
m _{PL41}	51A579EED2663A002D32D10A0753173612F4D5BA167D1807C61F25C4D42C063682E8E9DD019 F79D446A046EB3F75E50FEB228DC52F08E694B6
M _{PL42}	CDC644FE4C0C6897604F9D14D714123BF16FFF0E49F35F674908CA60653702FE27BCCA2A470 98453AF8661055C8C549EB6A951A8396AD4B94D
m _{PL43}	750A10366C595373C5001CA3E4239764B1409D602CF6052B39BC6A3255A15FE06C782C4C5F8 47026A7E79838A2933A61C77BB6CBF5915B2DA5
m _{PL44}	B7490686D78E409082C4C48FE18D4C35429C20AADF96076B92FC4E85490664753DB0891A0B2 7FD849BB7FCA99E3B38F22F8C662852C0D35AA6
m _{PL45}	D86E1B575B47D23DA811806A54C231281F03317830E7BD305D3CAA7D6382A5233104CFD54D2 2DF9F34535E5B390D9040CF1375FEA44CEC29E2
m _{PL46}	828655960C026EC67B683480992AC2ED2C43ABC606F5220C2945F373470BE7ED5BCCF7C1AA 0986BBCCC84F11F1658AA568FAA0A60C5F0B5BFA
M _{PL47}	D76230E02C8533653AAB99B288AA2ADE25A1C1BF28516C04239240EAF1EFC0B98974B51F886 861D8A1E9F5D62CFFEC309F071A9716B325101B
m _{PL48}	EA207662865B8A07D69648964DED818EE474A90B94473408871880E63EF0596B9FCFEC3C06B 86EA6AD2B06C91672EFB33C70241A5450B59B8A
m _{PL49}	9CB5459549909835FAB22F0D99298C120ACF479F814CCE749079D40688F28101037762F125C7 76DA9C5FA1FCE0E76E452F8185354FDCDE94E2
m _{PL50}	227506304AEC1D6F93569B51FDC3405A0F38194F65BE17163A3CB9827A35AECEA757D020FE2 49377ECD561428A38FEED004EC859C272563185
m _{PL51}	96B9AEC9938910F0E533422A3977519B05CD4AD3909BC15A7502D48D49C124FA192A8E57027 CFEB11DF542010603CE5C9FDF8E626D4FBF8CF4
m _{PL52}	A6AAD06E095A9BE0BD9F8A2ED40C3CBDBAE91C700CBB778C8696CC06F3A675C16BDB2918 E5F2111005A8727206DC6A9684E05655185C398EEB
m _{PL53}	CD168D384A78DA172991AD333EE2A9880905AFE59E2A2A4AC4414C40F82874F98A3CBE7B44 F4C7F4710B35FD88AFC0399FAEB070EB9CA4D30A
m _{PL54}	22016CA87AD1549174A8699DD65599697871091457E83E0912E7E77A06531C209394D283D18A 38662B73681DD9C5BF330FED978BDA7D487CA8
m _{PL55}	B9401B0843AA6F7827A13BD66C922287E8886C31EB5B90B82B472CCD6DA3D8D4FBF78B8F84 96DFA8252B06429D5DD17142F1C908ACCD70EA0C
m _{PL56}	E42B9EFDC5D09AC27B3C7DA28D02493A70521223B9D7A76A9D13E9C171017964D16A70C08E AD02C3DC948889C23E365AFCF01BF20B89B0BF5C
m _{PL57}	9DA0180168DB915E9F3597B59312198E1B5CC00D743C2ECB0DBAADA3E35A2465ED1EAA9D7 4734D49A313CE4DFF020D0760E3153DC485603943
m _{PL58}	B6C966619ECB98191D719C187C07BD503425650CAA3A2D1F2DF5212B1441D7A0C1D36A4C9C 2550240AD17CA43BB3943DFFFBF1E283D81299CC
m _{PL59}	DB0E8C41F08A03D477C1AA548799274C4BF3EB68F2636166FDC8D4B1E7132539930297E228B A232BB5C279FA5ECA3AC10E24361AF050A453B8
m _{PL60}	89BCE2DE2974EEBA833CF32F224C85A2891484478527DB48FA6ECEA84C5E288CC3914CB54A DA0476278750187F68FBEA41017E1E58DF1A5A3D
m _{PL61}	70A457D1314A278625443EEB52520815EC92CEF17417B97440DCB531BC1CE83212F63270418 D0FBDE71F6DB9E0EA88772E1E4535B6633E4425

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL62}	C388460AD54B36C4452CF0433BD347100ACCC24C79C535AD3E1F23FE0425E93A044C553BFA
	116E09AA4BB32F13CFA76FBA1BC17520F45EFD44
m _{PL63}	0BAFCADCDF9AA2846681782CD3B90CA036A863C78EE1507620BC394D0C6804B4C97A15BC9
	C0D7B79E6892EA1BFF1A0DD9573A9213AB140D0D2
M _{PL64}	833B0226789A62882FCD27A30885E67872B1A1C2FA484AD498011599DD57E8E2A07A560B4716
m=:	7AA5F60EF47177DBB1632D5387A2896348640B 8F52820323ABA5E6C6B465821B621600B980E59F53A599DA5646BA103214336836CF17E3386C
m _{PL65}	E4FB2BC5F25CCB30CF7F500546828EC8786B8E
m _{PL66}	E2E9A29C3C8207B9A4508FD2F667A159F068EEE8D00686F46EA904C3692C1D79DFF1B32E510
1117100	3720D47B4B58AC35384A26087027E141B3126A8
m _{PL67}	70E7C39FD2D3AE1DCE341699A544D801A8688A6EE47C5CB3630022147DDC06241FC5337A34
. 20.	8A462B2472DEC5E104DD520ADA5114DB065D4B0D
m _{PL68}	9E3483CAB164BD053C4971D4D87494CC689033D589EF80E5453376E4A8DCC02183B98C36B0
	FF7DDC0AD07FCE8B4D5164371BD03A2110AD1247
m _{PL69}	04DA1C649B0608938DAADD3FE920A4F681690C54505429DBDCDCF10067AB5714BCDDFE1F2
	8692710F794765781C1D233344E119BEE8A8416DC
m _{PL70}	7A18D6D30BDF44410714C3DCA27D8F9EA8A542D87122205640B98313C91AD9A0B993A5A7BC 3E035F93B88BBE6D4204BC82A9FA8D4C1A7618CF
m _{PL71}	EB9525E10265A48733C8E0E77E459310112A71DCA680F68AC044B64BC0A31D02EEA0F7ACAA
IIIPL/1	AB7F1E574E94FEA2D1301CB14B03263DA8122B76
m _{PL72}	E706C6ED2D6F89153835079BE0C6D45310845EF2F9F6C6AE91B7419810508BA501C0148BF09
	955BAD90D6391BA8EBA5CEFBD23221CC75143D7
m _{PL73}	DF071A10AC4120CD1431590BEDCFF9483CA7047B19590D035D309240BDB4264E9A3A2761402
	EC97FD8BC51B4AF32E37FBC47162A2357D18751
M _{PL74}	F0F952B2238139F46D8254D1A2C1C22A16BA71EC0C0C900ED1442452D7F44C798BC65FF4067
	1B88074BA0B74C6510996EEAC495C5B49C37DEB
m _{PL75}	1C86BD82EDA81FD65418D3837B5552A853791456D93B06C62C650D86CFBEC269AFFD772763
m _{PL76}	B390978DD2552C88AABA7838489A6F5A8E9C41E95FFA2215819BF8A5BFE39C8A706CC658E5
TTPL76	49E966611B843A1468406C41C09D1560BEDA4F1B
m _{PL77}	1A69EC9D053C7E84BAE7A48CCC71857D0C6B06D1065E3EA4633B133AA022B8104F6EE7C69B
277	6184B746C8822958B0A16686F27C8A0E3B4EFEAD
m _{PL78}	C95B2070816DC97C6D8DD2583263E73F9AAAFD13F0548D2EBD835824418F11E54111005FB71
	3AB234BE412347358281C7DE331EDD21B8BEA52
m _{PL79}	56D6408399F23C2ED85EE0F68111D69A91A3AD9A732AC57CA08F86CC28B3CF4E4B02EBBA0
	BCE5CAE5BACC4D52004070797C04093A84BB18DBA E662E7043867BE250764DA0596D34A582A619B408B505E6211DD6286E93A37F95B1EA680C0C
m _{PL80}	5F3E777E3F71E8D75495D59043217FC0E222E16
m _{PL81}	27D5E681C222297AD478A079EF12F1A98F744B66335303322EF8880B931FEBF8322F4302944E
	80BED468A0A516D410B183D863795992DA7DDB
m _{PL82}	5100336C05F9E5BF35201906C1C588858E0DAF56130DF5554B9AB21CA15311A90290624CD63
	E03F5EDA49DB7A0C32AB5F1CA427A2D5635FDA5
m _{PL83}	C696DC993BFAEA9A61B781B9C5C3F5CFAA4C8339D8B03A9B0387883D0482A41AC78D652242
	5959846E561D26A30FF79A205C801A85889736B2
m _{PL84}	D562297561AFF42D3168296C1153E4E39BE7B2EB0348BC704625AA08391235075EE0DE0A79A B03222FEDB27218C56F96EAC2F91CC8FCE64B12
m _{PL85}	DD0B6768FC01CC0A551F8ACC36907129623E975AB8B3FF58037F1859E2FA8C62C2D9D1E850
1119185	6916029A2C3F8CAD9A26AE2CC652F48800859F5C
m _{PL86}	923920696EB3AB413786C41854822282BB83F6900D33A232D470BE198BBF086067B72613300C
. ====	593B74251E2F079857ADBBCD86583A9DCAA6DC
m _{PL87}	B8EF30C797D8D2C4EF11244F137D806E556A436626D0115A621C92C34D166A68BCEDFA0040
	DA8FD6F987B1CD5C2AA1C1B045E64475F0F8DABD
m _{PL88}	E1887001D414405ED6419E9EE1D1D346D924ED57ADF04B31B7948099976B2D1501A60DFFB28
m-,	7AD44C8783DF0C1EA5AA5D273D1389C8EA22DCC 8C2E379A58AA96748141CA84C35987905F984A49D3AD9BFF7807AC244C16C1DF74343C2E1F2
m _{PL89}	5514F5A0954CFBB3C92E25EF783136844998AC5
m _{PL90}	78F8A99E0A54E27F51C0726FE7A11EB26B1E29FE65F55AC8AC58011465900B958488A90F6DF
1 200	614A58431DC8B6C6B9A6F032EE0E0B1306EC4B4
m _{PL91}	88F7A31B7B20E0F05CA26E729B4F8A1933962D7BD7BE3E1EB130B28C794C0B4D01CADE0900
	6FF97E80117509733F3A9DC225413A0AE08CA662
m _{PL92}	BE4DFCEAC18905AC8D5DA27A794F88A4D3058D2EFA3B075A819DEAE688EAF8940A653ED71
m-:	04E7B403D490F0A9030264E1F12B8922C75775E61
m _{PL93}	5BA4B79FC4550234D8922963BF3537485E3C8745A5DB90D3E2E454B30FF61112F508155B7C2B 3C4C628AF846240C2021ACDE547E5A41F666B8
	007002011 0702700202 170012071 2074 11 00000

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL94}	00556D35649F7610AB24A43C4F16D6AC0571FD126F11880C5CD72100D730E4E4D6BB73C33F8 37FAF1072743B249ADA2E09598B1EB23F1180A7
m _{PL95}	7A0CC9F21BD69CF3023E944545C2176EF0D4F450B765C28359FB8A32137D043D0E5713E67B3 F61320985D2C6106605081F87D2296321468A2F
m _{PL96}	DA669880995B0671201172BABFF141D5854A245E211879EF3038A7C84170DADBD368455F2465 3161E7886E15B253F93E3A3C568EFB17CDEB1A
m _{PL97}	4E294E53D1661C1F6F748302A7723DA951C00FDB8BEBBF67A68710BA0F1A255DFB1627059D4 1A23D3961726DE6FEB10E5D209CC4505B209812
m _{PL98}	73385DF701414E144768A67EF72924B1653479E962FB1554B7E54BC5284D9B3E41C0C133F878 972230721918AA425501B920B204FECE0C7F8A
m _{PL99}	F4492160805F258CE592DF4D1200566F81D173458D78EA3ABED79A14AF88170DB1D4A9A5931 D2B80C58C27FE17D806E3E6A66CDAAD09F118D4
m _{PL100}	44D562D9012D8B07B8F44596467C11A163982BB7EAEAC184078B6B8CE46B5D7E17C39CEF57 6A025491183017FA09931D070B307B86524B03FF
m _{PL101}	FCAEEFCC49A13B4FFA12C0CC6A2B90CF4F57D78B1E98294B04675C2F0991661FDC61A452A2 47F8C29E0284AA21026F368307375AA2C3F1E12C
m _{PL102}	C486DF0510DCAD5AB86E178A686D398E11A0ECFAC5A326C10129257E5456B22FB8E147E919 0D9929A5DFFE44715FA47D62F04CFC9B1C201414
m _{PL103}	C10AF383DC708E257E15A8AB337BCE684A2F4AC7A22DC2C25C277F8E8D0858E79317CDDD9 AA2EA6CBE604D24AC0945026103E7B4126FD361A4
M _{PL104}	A5C60A181148D9A931B2DDDB9D169648BA54F366B4EFAE88F6861909EE0F07C037EE349D0E C59A823286E366CA3943589EEA7F828C3728085F
m _{PL105}	96136AEBD5E28462B0421DF292BA899FFA660D80EA01620D2C7490E5347127884AA3C3D1FF4 4BCEEF6C29EC589CDEF200C5742C5964F8B2B52
m _{PL106}	40F63C04ACAD986255D1E16B769A6D4C11A1D075E804BDC0AC61923E9A67F5D741775632807 2455F6E22B1C64E06F367D1B0808295C2D90E22
m _{PL107}	F4B82D413578C4888C5F002CF6D0E03778134A860436551FD57537E4CED334B3C9CEBACE615 238271717AA762448B86FA53D2074BCE35658A7
m _{PL108}	BCCC92D72C920E685530591FC351743D1E23DE044BF81D32650406113E23ECC757FDE4E386 B6E2E7195EE4969717A7BD0812AC312B33A54308
m _{PL109}	6ED59DE0D44370A861CE2B42CF5E578E764A682AB5777905EE027D7160490EDC6C28989B238 05AA697FCD215CB401BC5E4D430624C01B16192
m _{PL110}	DE80C0E273B92CC3C5034F7A20DB3914643C430B425C8B9249EAF73ACE8C3BCF17957242CF 534D87A67D4DC0252275262E737F4095450CFA14
M _{PL111}	9505C4FEF2A397D5059F4729D013292A8321FFFA929ACB0A210D0A13E13061227C44A68FBD8 CE6B66CE3D783363CD039AB35EE52603E09B758
m _{PL112}	E8BE90D7F954B14D8002A4CAC20765ABEED80634498C836D79B0F9338DBC17B28F05CF4E79 136779E1C55AA30B6215F890882887B3B53C23E2
m _{PL113}	9F4B622C1358AE5468DC31E4B2CA320E5E20458C1DE5405BF4F9AD7D45A5BCAA39EC0626FF FC698C16A009CCCB7A18A64E85E70BA71731BA24
m _{PL114}	B91B2624843CF48299AFC2B1442570B41F28F578530D1E322E0B54282372131C71ACB924E707 68A243EEC3200E7A5EBFA77111D9FB07FEA8AE
M _{PL115}	965F42DDA3A4650FE2F5103932B68F166FA424B9F0F7045311D962C2A9F66B9BC6C66FB480F 9800354E0C54A72251071422CF1DFC44F94C00C
M _{PL116}	08ADCE48699FC30FA0788073BDAADB9177BBB4C1CED41F93085218364B8BAD8488561EF0FE 1B0DDAA403C602494CB35697D62AA0A2B93A64CF
M _{PL117}	9A313BED80B1220D77C8ADA4B2E0B3D284A5120A94B741380923C78D3AD32BC3E71EC6EEA 520E9D447D8727697598BB987F17506F482003ABD
M _{PL118}	24C9AD4C14EFEC002A3473FCAB04E492F2E269161A2960BA8AF09FD710B444A40C4E8B1384 18E62301E91FBA97AFDC58759A76D00F676736C7
m _{PL119}	6514C7733711CE4942CD2123AB37186EB7FECB7E78ABB28744864942FCF4C0F810054AF55B1 042EB53064F0857C61D85B2CF0D2DC5826AF22F
m _{PL120}	B2C80CDC83E48C36BC6FDAB8661208EAD392F3A0571BE41DFAD765E744932ADEA50061E66 C05498A5381B2A1F1B446587089DC4E4A2DF03D82
M _{PL121}	639368BA75CC709A3D9F28EDA237E32C2017A9BF1E382045B9426AEE0A4049DCB4E1D7EBE4 647B855212824557497CFA039885A3BA42F98F63
m _{PL122}	6A70DDC17D0C8024B1C853F0C1948561EF32510151BE0C63BCA9171F20217891D1021EE7258 6CAFF557F8973336913A94A2A699B8740B054B8
m _{PL123}	2E32E3A35CCD001172CE310B63B4E406126045A0FA3795BE3E3D9B56F72405FC94FD8994681 8BAECD24A61BABBBE2D23052AB01EF73CA0CF4A
M _{PL124}	829395C35205A480AC1351C25E234BF52D384A3DE1C5138A650A6F82F739757D812D9C38231 AB9FD81AA0648B11F6F6113F9312C57624FC746
M _{PL125}	D98FFE19C0AAAAB0571A9075ECDFD3E7373F5255DC669116A8C6913F0123E598F930934C5F6 A601C37C529C371A0C391B59AC5A9E286D04011

Code ID	Basic Midamble Codes m _{PL} of length P=456
m _{PL126}	C1A108192BCE96C2430A63C189BB33856BE6B8B524703FCB205DAEF37EF544CD43CA09B618
	1B417398083FF2F781BA4AE89A5CA291DB928D71
m _{PL127}	42568DF9F61849BF9E7DEE750604BE2E0BC16CC464B1CDE15015E01D6498E9F3E6D6950E58
	24651F212BA0057CE9529B9CCAB88D8136B8545E

A.2 Basic Midamble Codes for Burst Type 2 and 4

In the case of burst type 2 (see subclause 5.2.2) the midamble has a length of Lm=256, which is corresponding to:

K'=3; W=64; P=192.

Depending on the possible delay spread timeslots are configured to use K_{Cell} midambles which are generated from the Basic Midamble Codes (see table A.2)

- for all k=1,2,...,K; K=2K' or
- for k=1,2,...,K', only.

In all timeslots that use burst type 2, K_{Cell} is individually configured from higher layers.

In the case of burst type 4 (see subclause 5.2.2) the midamble has a length of $L_m=320$, which corresponds to:

K=K'=1; W=128; P=192.

Thus for burst type 4, K_{Cell} shall have a value of 1 and the midamble is generated from the Basic Midamble Codes (see table A.2).

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS 25.223.

Table A.2: Basic Midamble Codes $\,m_{_{\rm P}}\,$ according to equation (5) from subclause 5A.2.3 for case of burst types 2 and 4

Code ID	Basic Midamble Codes m _{PS} of length <i>P</i> =192
m _{PS0}	5D253744435A24EF0ECC21F43AA5B8144FBDB348C746080C
m _{PS1}	9D7174187201B5CE0136B7A6D85D39A9DD8D4B00E23835E4
m _{PS2}	AE90B477C294E55D28467476C6011029CDE29B7325DF0683
m _{PS3}	BC8A44125F823E51E568641EC12A6C68EAFDFA2350E3233C
m _{PS4}	898B7317B830D207C9BC7B521D5715680824DC08347B2943
m _{PS5}	466C7482C8827655BC13F479C7C1417290679A9841297C4A
m _{PS6}	AC0734C27C7DC1B818A8492744290DFE866B0EBA62B0B56E
m _{PS7}	0A92106325B15A8C15FC3764724CE67A5056D50A77F9360E
m _{PS8}	AE69F62E23035083E6094B89493D33E06FDB6532D473A280
m _{PS9}	B485D4E3614C9C373EA1365FA6FA890E9844084EBA90EB0C
m _{PS10}	66182885E2D28360D2FEAB842C65304FFC956CE8DC8A90C7
m _{PS11}	CC30A9B0A742FCC1E9A408415368391F1299AEA3CB6509FE
m _{PS12}	673928915886947F464FDDAAD29A07D182328EBC5839089A
m _{PS13}	4418861C14D62B46EE6D70D4BF05A3ED801A01BD6CDC5235
m _{PS14}	DAD62DC88F52F2D140062C2330BE6540E6F86192322AFB04
m _{PS15}	A2122BAF24529CEA9855FB43CE40923E7CA7B30D92E40702
m _{PS16}	6C44AB41E11F54B0929DF65673BD231F92A380132D9F1712
m _{PS17}	1DC2742E756CDA6421340D0087DD087A615E4B8688CB2F75
m _{PS18}	2E0105328B56E9E07D9B5A62F38B08AF8D8C2817B54F3302
m _{PS19}	88315EC30A94CA4EDB2C77079D9BD810A2E280B50DABB213
m _{PS20}	440E0093D28CB2B2B0A95D18CEB4AB934C33FA45C1CFC7B0
m _{PS21}	CC9BF85D41A96A6EC314F9611D5E1C0672556C8850801BB4
m _{PS22}	1ABEA04C99BC26972715F01957C0B6B959CC71CD88120817
m _{PS23}	EC5A33DA0BA4470442C5CB324A8E47B0A9F7968FC8108EE8
m _{PS24}	F82086290271DB446B5B1DC15D9BE96414B19B3D5E0F540C
m _{PS25}	11A1A790D6958FD3A9157DF1E05D1378248CA201EBCC7592
m _{PS26}	AA8564882231907BCE78092DC6C9DD4F5A0E4A34AFCFB809

Code ID	Basic Midamble Codes m _{PS} of length <i>P</i> =192
m _{PS27}	912EE2238212F87BC7CDA7F30441ED184A6AA954EC4D20C8
m _{PS28}	2D200D8B8891B804673E380A1AF5AB875986E29D37D3FDC9
m _{PS29}	75E086B6C818423491BF9D6365C52FD1C5E42A576E268170
m _{PS30}	50ADBF27DA2A3701470186B699118E16DDB0D10F705607B1
m _{PS31}	656C0692B4E22023590A906D2A74DFD471C883A7B1E0B3A2
m _{PS32}	C21FDACD09A3CDCE74C4794010A3E45769B142505C56A0E6
m _{PS33}	CD9392A87C2D4D7CE5801CDDA8A76339B6F900F008B290E2
m _{PS34}	956426FEFD8B8D52073E87984E10C4D255064E1372C04A24
m _{PS35}	C4F4D6DF1B754AD6063FD10C331C1428ABB27B0700134B94
m _{PS36}	B65548082B34E9FAF43F33C4070F79099758CFD41B491A11
m _{PS37}	C8317EA111A82B04E78B88B864B1EF5D711BBEB4A0527036
m _{PS38}	8FB7AD1188E8D1A5219845013672560FD38904E70537403B
m _{PS39}	B41A324E0D80AA0598A8D391C1D7FFC82B4A075218E98EC3
m _{PS40}	49A6350A62E208B011E86528B9A481A0E76D723F6675FF82
	C344C8C23C42A7B7442E6022E95AE4B08A4BFA786F35F911
M _{PS41}	28F430CF67D69C9DF60E25656413BC5F932A022DB1406C44
m _{PS42}	2FA5D70CF0FED4213F32116051450391C2A627D9B670C428
m _{PS43}	959537D988FDD4F1360B4E84701AE5409229C30EDF8BC404
m _{PS44}	CDD2E0450F9EC12F81391AD4633CB29F315B4A0A890A9A22
m _{PS45} m _{PS46}	158776A20B4B82C563EC08F086830EA66DBD2DCCB4DF6026
	431FCACBE48208975950342709D11F19AD5FB047F3B440C9
m _{PS47}	86B141AC571BA6B42653B12FF04D4F0E6C81F3EB608660A2
MPS48	86D297ABD34E8510F6CDB0EA617F1F1051C8799117B02211
m _{PS49}	80B2D9530B34E781311D95CFA3857F277CC07014D324AF5A
m _{PS50}	2B607B93FD8B45601C1E574E14CFC6912C22AEC1045ADC49
m _{PS51}	
m _{PS52}	D234C5C45E105A837E6DD74BC4E534523A20317BA0625A29 768CCDB3E2A7A2B863128382590946B25472BE2BFFC40641
m _{PS53}	3DA38212E0A987EE1F665D4E13C2AA4446E00A76C948A073
m _{PS54}	09173135E4A2CFC8F2678750AB5257110906F013587BDE82
m _{PS55}	522E070B266F35E99C1F3C42D2017F8E415550492B72F086
m _{PS56}	D63E4BD805262A3DEF05C7D86C422E5048921E5531784132
m _{PS57}	564AF806E28131611E5F884229265D446A50E1E488EAFBBA
m _{PS58} m _{PS59}	A2603E009D3D30147727B750C35C62299AF754D3E4A54E1C
m _{PS60}	938504B02599D33E28246E4271C375AE81A3BBE8D3F8A920
m _{PS61}	461516B2CAC6FC42A4B707CC6073BBE573C014892C811776
m _{PS62}	29186DE4CCAAB2CD0100BB19EA595879D63F0F0CFA881AA5
m _{PS63}	A064B449CB784A91B803369CDC5EF61A670AAAC044BA3E68
m _{PS64}	8719C454D88FF5149DB943CB6CADA01D0B9664B357A18203
m _{PS65}	A27EC68720F00A714AA2C45A7EF232286984D7B193F5C916
m _{PS66}	AC8361676AB424E48F0789082B0CD2EFB8D2E627D041DD66
m _{PS67}	ABA1BEB0064733A0620906BF2B29C95883F069D7E4C35D39
m _{PS68}	9E22EEDED47D92CA1D0B7530EC6062287BD83A04874AE00C
m _{PS69}	0BADEF288B20F5686C5DE3A71219AC2172054326BE831696
m _{PS70}	953801EB2AF58C2F80E49A6CC46085CB554243E3B3BBEC8C
m _{PS71}	333A504C51C8FAC5025994565C3F600F154F64FAEF4EA484
m _{PS72}	A6583E19647662005474153A6F8DD88A473853E94B720CE7
m _{PS73}	90ACAF707D18AF34F5848C58166830AF620ACDC1B2DFDDA8
m _{PS74}	39C5C598A374EA82F3F83378258248DAD3808812DD0E74BB
m _{PS75}	F79525DE694629346D73F6256CC0F140F82603197AAA1844
m _{PS76}	B8C2A8F139097699A693022E78588D4058DB0A65FF52F813
m _{PS77}	449B50C2A52996FA5A828A907F30F9F460EE3D99930DF890
m _{PS78}	62CEC9574D30184BCB4F94EECF0CC23D2D2A8D0003F0AA33
m _{PS79}	B56D258889703F76A0738EE3A7D355994159A4851833E198
m _{PS80}	65894AA54C0F6C9A206521C9FC379A8AAF6E621C03CF849C
m _{PS81}	2D47F3414E30CC02C6835D95C9BA204488F0FFCB4852677D
m _{PS82}	12BE4DD8B906B584010F8A330AB67B278E8642FA33D51B68
m _{PS83}	BC928A90A4B10906CAEE638BF768E08542F48F1676006DF0
m _{PS84}	30C544E437C8ADA143566CD1BC4E9E7BA84139A08505C2F4
m _{PS85}	84FD5B05506192B753FBA2C719B584E0EDA01814999867D2
m _{PS86}	191F14DD00034E03AB5BB4342F1138B2CD33784E60CFD75A
m _{PS87}	B8ACE7990B6A98A80A61162C4D2D5F88F24E8F7DE4207590
m _{PS88}	EC1DBE72E8EED0C61054FC2695422AC0AD2D888265B21AB0
m _{PS89}	9A1B4CA467AB7E082AF4278E44D177EA78424508C23E8B08

Code ID	Basic Midamble Codes m _{PS} of length <i>P</i> =192
m _{PS90}	999EE541C608164AC975214F3A37A677FC2CA03E2C2A4B20
m _{PS91}	1BDCC20265031432917A2EB828FB356A22DF9CB609C0F8F3
m _{PS92}	EB4A81859C93338B8A1B87C02C815AE09D765F6F2249B958
m _{PS93}	E6A5D1629F4CF09A1F280DE0C480D4C73B26ADE321A50AEE
m _{PS94}	BAAB7286DD24C80B15A7958039B904F1CA83C310C8C7AFF2
m _{PS95}	12220F72619E983717C68FFE1C4148F2354B7B1955B65620
m _{PS96}	A198706E24FAA08BD09EE392414816038E667BB34307D6B2
m _{PS97}	30B3493B4C035881A7A722E4546527AAE787FA2C0893AC46
m _{PS98}	5A7318126522843DCB7F00A2D9F9BA8F88963E4152BC923C
m _{PS99}	844844B0CACAB702C332CE2692B4166F4B0C63E62BF151BF
m _{PS100}	B8297389526410313692F861DC60DA86A23607F7DDE24755
m _{PS101}	6C1144CF8BC01538D655D29ED62DE6E74A3180EC905BF1E0
m _{PS102}	E9DB3221FACFC5C88691A7013EF09672A130D52C3413AAE2
m _{PS103}	2FD0508615EC4CD4BF18ADD46D777078869130C8921A4F0E
M _{PS104}	40911B4E0525AC874228F6EF642E59154730CB187C7E417A
m _{PS105}	2034C6A027D4D850F5184AA64C3153231F4651B616BBFCF9
m _{PS106}	57833235451525A1DFA213FCE0B419B6494BC7B99F488410
m _{PS107}	6DC3D57F2E39158D036825F8804810D77CA1ECA610ECD894
m _{PS108}	F5C50DE43AA7B731CAB7683524021701F97650499A7070E4
m _{PS109}	F2184D2699785442E09FA22CC2D60A5A13FFF22AE660A470
m _{PS110}	EF0029DE0D79207205458CF4D7328E81A93518D93C9A74BD
M _{PS111}	9D6D8992482FB885AA5E878C3BA2045538B09886C23CDC2D
m _{PS112}	C0A5AB67D1CEA126F6476C75443F0A11CBE749412EF03104
m _{PS113}	1853A5C20CDF968C5A180D8EB5E72BF15517D06680D98412
M _{PS114}	8CEA1223227ADF37D0DAAB320906E1C79029F480D25181A7
m _{PS115}	5561038E96A658EF3EC665612FF92B064065D1ACC1F54812
m _{PS116}	C55A6263F08D664A1E53584560DFF5E611640D8281D9A843
M _{PS117}	4386A8EA59124D043F29056A4598735A4FC7BC11119B90C1
m _{PS118}	D6571B20668BED50BD7C80388C162632BCB069AA67C7FC22
m _{PS119}	4F9F09ABBC1391EC2CCA5359FB52250E533BF04324154106
m _{PS120}	662659F42188C9453F6E6DF00C579627045DA1461A3A0EA5
m _{PS121}	8DCC9274C0C2A9BA6096BF27FACA542CD01CA8653D60A80F
m _{PS122}	5C1210A1E50E505F6B73C90156C9D9F19AE2310BBD820DF0
m _{PS123}	B1E0A7CE26202E223D4FC06D5C9BBA4E5F6D98204D2D5286
m _{PS124}	DB506776958E34552F7E60E4B400D836153218F918E22FA6
m _{PS125}	ECAA60300439B2360B2AC3C43FB6241ACDE5055B295FA71C
m _{PS126}	BF1E6D9AA9CA4AC092BE60500C77D0DC7A6A236520F86722
M _{PS127}	051C5FA122845A30B4EC306B38016B45667C7754F92F13A0

A.3 Association between Midambles and Channelisation Codes

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with a *. These associations apply both for UL and DL.

A.3.1 Association for Burst Type 1/3 and K_{Cell} =16 Midambles

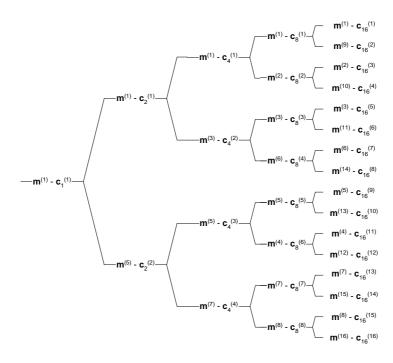


Figure A.1: Association of Midambles to Spreading Codes for Burst Type 1/3 and K_{Cell} =16

A.3.2 Association for Burst Type 1/3 and K_{Cell} =8 Midambles

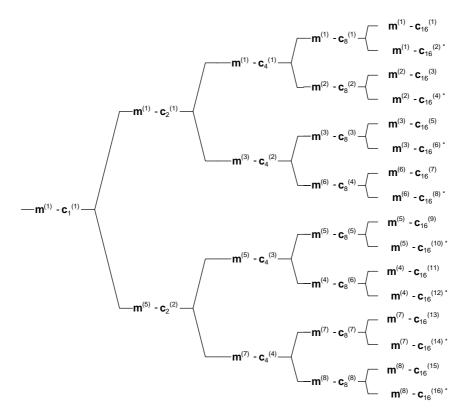


Figure A.2: Association of Midambles to Spreading Codes for Burst Type 1/3 and K_{Cell} =8

A.3.3 Association for Burst Type 1/3 and K_{Cell} =4 Midambles

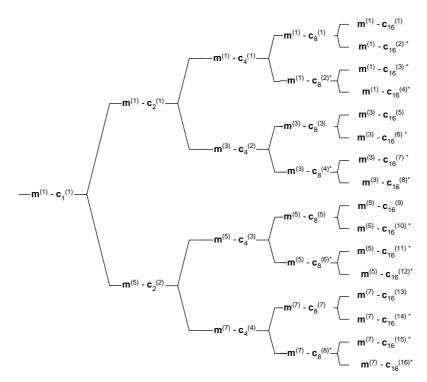


Figure A.3: Association of Midambles to Spreading Codes for Burst Type 1/3 and $K_{Cell} = 4$

A.3.4 Association for Burst Type 2 and K_{Cell} =6 Midambles

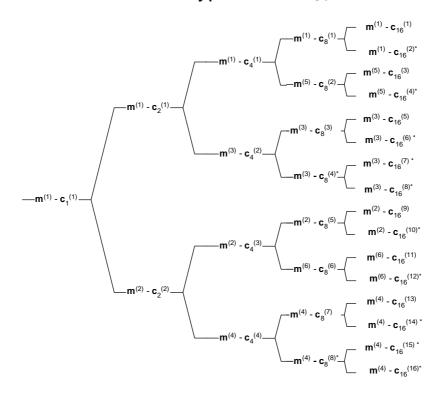


Figure A.4: Association of Midambles to Spreading Codes for Burst Type 2 and K_{Cell} =6

A.3.5 Association for Burst Type 2 and K_{Cell} =3 Midambles

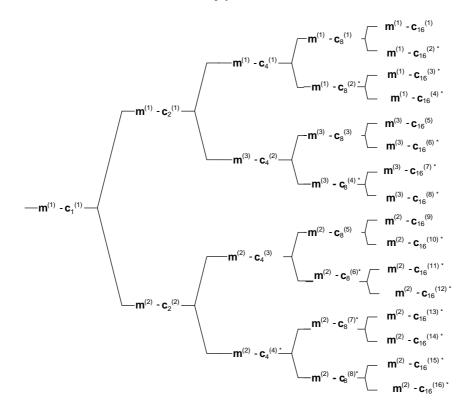


Figure A.5: Association of Midambles to Spreading Codes for Burst Type 2 and K_{Cell} =3

Note that the association for burst type 2 can be derived from the association for burst type 1 and 3, using the following table:

Burst Type 1/3	m(1)	m(2)	m(3)	m(4)	m(5)	m(6)	m(7)	m(8)
Burst Type 2	m(1)	m(5)	m(3)	m(6)	m(2)	m(4)	-	-

A.3.6 Association for Burst Type 4 and $K_{Cell} = 1$ Midamble

For burst type 4 there is only a single midamble defined, thus all channelisation codes are associated with the same midamble.

Annex AA (normative): Basic Midamble Codes for the 1.28 Mcps option

AA.1 Basic Midamble Codes

The midamble has a length of $L_m=144$, which is corresponding to:

K=2, 4, 6, 8, 10, 12, 14, 16,
$$W = \left| \frac{P}{K} \right|$$
, P=128

Note: that |x| denotes the largest integer number less or equal to x.

Depending on the possible delay spread timeslots are configured to use K midambles. In timeslot 0 the number of midambles K=8 (cf section 6.6.1). In all of the other timeslots, K is individually configured from higher layers.

The K midambles are generated from one of the basic midamble codes shown in table AA.1.

The mapping of these Basic Midamble Codes to Cell Parameters is shown in [8].

Table AA.1: Basic Midamble Codes m_p according to equation (5) from subclause 5A.2.3

Code ID Basic Midamble Codes mp of length P=1 mp0 B2AC420F7C8DEBFA69505981BCD028C3 mp1 0C2E988E0DBA046643F57B0EA6A435E2 mp2 D5CEC680C36A4454135F86DD37043962 mp3 E150D08CAC2A00FF9B32592A631CF85B mp4 E0A9C3A8F6E40329B2F2943246003D44 mp5 FE22658100A3A683EA759018739BD690 mp6 B46062F89BB2A1139D76A1EF32450DA0 mp7 EE63D75CC099092579400D956A90C3E0 mp8 D9C0E040756D427A2611DAA35E6CD614 mp9 EB56D03A498EC4FEC98AE220BC390450 mp10 F598703DB0838112ED0BABB986C14861EFF mp11 A0BC26A992D4558B9918986C14861EFF	
mP1 0C2E988E0DBA046643F57B0EA6A435E2 mP2 D5CEC680C36A4454135F86DD37043962 mP3 E150D08CAC2A00FF9B32592A631CF85B mP4 E0A9C3A8F6E40329B2F2943246003D44 mP5 FE22658100A3A683EA759018739BD690 mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB986C14861EFF	
mP2 D5CEC680C36A4454135F86DD37043962 mP3 E150D08CAC2A00FF9B32592A631CF85B mP4 E0A9C3A8F6E40329B2F2943246003D44 mP5 FE22658100A3A683EA759018739BD690 mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP3 E150D08CAC2A00FF9B32592A631CF85B mP4 E0A9C3A8F6E40329B2F2943246003D44 mP5 FE22658100A3A683EA759018739BD690 mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP4 E0A9C3A8F6E40329B2F2943246003D44 mP5 FE22658100A3A683EA759018739BD690 mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP5 FE22658100A3A683EA759018739BD690 mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP6 B46062F89BB2A1139D76A1EF32450DA0 mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP7 EE63D75CC099092579400D956A90C3E0 mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
mP8 D9C0E040756D427A2611DAA35E6CD614 mP9 EB56D03A498EC4FEC98AE220BC390450 mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
m _{P9} EB56D03A498EC4FEC98AE220BC390450 m _{P10} F598703DB0838112ED0BABB98642B665 m _{P11} A0BC26A992D4558B9918986C14861EFF	
mP10 F598703DB0838112ED0BABB98642B665 mP11 A0BC26A992D4558B9918986C14861EFF	
m _{P11} A0BC26A992D4558B9918986C14861EFF	
Im	
m _{P12} 541350D109F1DD68099796637B824F88 m _{P13} 892D344A962314662F01F9455F7BC302	
40F070F0000D740440400DD404FF4000	
m _{P15} 6A5C0410C6C39AA04E77423C355926DE	
m _{P16} 7976615538203103D4DBCC219B16A9E1	
m _{P17} A6C3C3175845400BD2B738C43EE2645F	
m _{P18} A0FD56258D228642C6F641851C3751ED	
m _{P19} EFA48C3FC84AC625783C6C9510A2269A	
m _{P20} 62A8EB1A420334B23396E8D76BC19740	
m _{P21} 9E96235699D5D41C9816C921023BC741	
m _{P22} 4362AE4CAE0DCC32D60A3FED1341A848	
m _{P23} 454C068E6C4F190942E0904B95D61DFB	
m _{P24} 607FEEA6E2E99206718A49C0D6A25034	
m _{P25} E1D1BCDA39A09095B5C81645103A077C	
m _{P26} 994B445E558344DE211C8286DDD3D1A3	
m _{P27} C15233273581417638906ADB61FDCA3C	
m _{P28} 8B79A274D542F096FB1388098230F8A1	
m _{P29} DF58AC1C5F44B2A40266385CE1DA5640	
m _{P30} B5949A1CC69962C464401D05FF5C1A7A	
m _{P31} 85AC489841ED3EAA2D83BBB0039CC707	
m _{P32} AE371CC144BC95923CA8108D8B49FE82	
m _{P33} 7F188484A649D1C22BDA1F09D49B5117	
m _{P34} ADAA3C657089DEF7C0284903A491C9B0	
m _{P35} C3F96893C7504DC3B51488604AF64F4C	
m _{P36} B4002F5AE0CE8623AC979D368E9148C1	
m _{P37} 0EEBCC0C795C02A106C24ABB36D08C6E	
m _{P38} 4B0F537E384A893F58971580D9894433	
m _{P39} 08E0035AB29B7ECC53C15DAA0687CC8F	
m _{P40} 8611ACBC4C82781D77654EE862506D60	
m _{P41} 63315261A8F1CB02549802DBFD197C07	
m _{P42} 9A2609A434F43E7DCADC0E22B2EF4012	
m _{P43} F4C9F0A127A88461209ABF8C69CE4D00	
m _{P44} C79124EE3FFC28C5C4524D2B01670D42	
m _{P45} C91985C4FED53D09361914354BA80E79	
m _{P46} 82AA517260779ECFF26212C1A10BDC29	
m _{P47} 561DE2040ACB458E0DBD354E43E111D9	
m _{P48} 2E58C7202D17392BC1235782CEFABB09	
m _{P49} C4FAA121C698047650F6503126A577C1	
m _{P50} E7B75206A9B410E44346E0DAE842A23C	
m _{P51} 3F8B1C32682B28D098D3805ED130EA7F	
m _{P52} 8D5FC2C1C6715F824B401434C8D4BB82	
m _{P53} 0B2A43453ACC028FE6EB6E1CB0740B59	
m _{P54} BC56948FC700BA4883262EE73E12D82A	
m _{P55} 558D136710272912FA4F183D1189A7FD	
m _{P56} 5709E7F82DC6500B7B12A3072D182645	
m _{P57} 86D4F161C844AE5E20EE39FD5493B044	
m _{P58} 8729B6EDC382B152185885F013DAE222	
m _{P59} 154C45B50720F4C362C14C77FE8335A1	
m _{P60} C6A0962890351F4EB802DE43A7662C9E	

M _{P61}	D19D69D6B380B4B22457CB80033519F0
m _{P62}	C7D89509FB0DAE9255998E0A00C2B262
m _{P63}	DFD481C652C0C905D61D66F1732C4AA2
m _{P64}	06C848619AF1D6C910A8EAC4B622FC06
m _{P65}	0635E29D4E7AC8ABC189890241F45ECA
	B272B020586AAD7B093AC2F459076638
m _{P66}	
m _{P67}	B608ACE46E1A6BC96181EEDD88B54140
m _{P68}	0A516092B3ED7849B168AFE223B8670E
m _{P69}	D1A658C5009E04D0D7D5E9205EE663E8
m _{P70}	AC316DC39B91EB60B1AABD8280740432
m _{P71}	E3F06825476A026CD287625E514519FC
m _{P72}	A56D092080DDE8994F387C175CC56833
m _{P73}	15EA799DE587C506D0CD99A408217B05
	A59C020BAB9AF6D3F813C391CA244CD2
m _{P74}	74B0101EB9F3167434B94BABC8378882
m _{P75}	
m _{P76}	CE752975C8DA9B0100386DB82A8C3D20
m _{P77}	BBB38DCDB1E9118570AC147DC05241A4
m _{P78}	944ABBF0866098101F6971731AB2E986
m _{P79}	2BB147B2A30C68B4853F90481A166EB6
m _{P80}	444840ACCF3F23C45B56D7704BF18283
m _{P81}	87604F7450D1AD188C452981A5C7FC9B
m _{P82}	8C3842EBC948A65BC4C8B387F11B7090
	10B4767D071CF5DB2288E4029576135A
m _{P83}	
M _{P84}	6F07AAB697CD0089572C6B062E2018E4
m _{P85}	D3D65B442057E613A8655060C8D29E27
m _{P86}	5EDA330514C604BF4E0894E09EC57A74
m _{P87}	B0899CD094060724DED82AE85F18A43A
m _{P88}	B2D999B86DF902BC25015CAE3A0823C4
m _{P89}	C23CD40F04242B92D46EED82CD9A9A18
m _{P90}	D22DDCC5CB82960125DD24655F3C8788
m _{P91}	54987218FBD99AE4340FD4C9458E9850
m _{P92}	BE4341822997A7B11EA1E8A1A2767005
	255200FBA6EE48E6DE0A82B0461B8D0F
m _{P93}	
m _{P94}	6FBD58A663932423503690CF9C171701
m _{P95}	D215033A4AA87EC1C232BAC7EDA09370
m _{P96}	CA0959B01AE48E80204F1E4A3F29CE55
m _{P97}	582043413B9B825903E3A3545ED59463
m _{P98}	5016541922971C703D16E284CBDF633B
m _{P99}	7347EF160A1733CA98D43608A83A920B
m _{P100}	908B22AD433CCA00B3FD47C691F1A290
m _{P101}	BB22A272FC6923DF1B43BA4118806570
m _{P102}	0FA75C87474836B47DC7624D61193802
	A22EBA0658A4D0FF1E9CA5030A65CC06
m _{P103}	
M _{P104}	6C9C51CA15F1F4981F4C46180A6A6697
m _{P105}	4C847ACF8BC15359C405322851C9BDE2
M _{P106}	C1D29499C0082C9DE473ED15B14D63E0
M _{P107}	7E85ECC98AC761005076C5572869A431
m _{P108}	D8F11121595B8F49F78A7039E44126A0
m _{P109}	1A0BC814445FD71C8E5B1A9163ED2059
m _{P110}	A7591F27F8B0C00C68CC41697954FA04
m _{P111}	6CA2CE595E7406D79C4840183D41B9D0
m _{P112}	C093D3CC701FC20E66F5AB22516C5460
	D0E0CDE9B595546B96C4F8066B469020
m _{P113}	
M _{P114}	E99F743A451431C8B427054A4E6F2007
m _{P115}	C0D21A344A2C07DF2A6EBE6250C7B91E
M _{P116}	F031223E282CF7A4D8EF174A908668AE
M _{P117}	E4BD244AC16C55C7137FB068FD44280C
m _{P118}	C44920DE2028F19FC2AAB36A0DCFDAD0
m _{P119}	3FA7054E77135250699E6C8A11600742
m _{P120}	D5740B4D8870C1C5B5A214C4266FC537
m _{P12} 1	
	F0B7942D43BB6F38446442FB81264B80
	F0B7942D43BB6F38446442EB8126AB80
M _{P122}	83DB9534EAD6238FA8968798CDF04848
m _{P122} m _{P123} m _{P124}	

m _{P125}	B51F6A771838BE934724AEA6A2669802
m _{P126}	D92AC05E10496794BBDC115233B1C068
m _{P127}	D3ACF0078EDA9856BBB0AF8651132103

Table AA.1a: Basic Preamble Codes

р _{Р0} 1.000000+j0.000000, 0.989177+j0.146730, 0.923880+j0.382683, 0.740951+j0.671559, 0.382683+j0.923880, -0.146730+j0.989177, -0.707107+j0.707107, -0.998795+j0.049068, -0.707107-j0.707107, 0.146731-j0.989176, 0.923880-j0.382683, 0.740951+j0.671559, -0.382684+j0.923879, -	Code ID	Basic Preamble Codes of length P=64
0.382883,0.23880, -0.146730+j0.989170, -0.707107+j0.707107, -0.989785+j0.049068, -0.707107-j0.707107, 0.146731, 0.989176-j0.146731, 0.098000-j1.000000, -0.989176-j0.146731, 0.098000-j1.000000, -0.989176-j0.146736, 0.382684-j0.923879, 0.740951+j0.071559, -0.923880+j0.382683, 0.146731-j0.989176, 0.146731, 0.098176-j0.146736, 0.707107-j0.707107, -0.998795-j0.049067, 0.707107-j0.707106, -0.146731+j0.989176, 0.382683-j0.932880, 0.740951-j0.1667153, -1.0028884, 0.989176-j0.146731, -0.923879-j0.382684, 0.740950+j0.67156-j0.0328630-j0.923880, 0.740950+j0.67156-j0.0326831, 0.382681-j0.049067, -0.707106-j0.707108, 0.146732-j0.989176, 0.707106-j0.707106, -0.989796-j0.049067, 0.707106+j0.707108, 0.146732-j0.989176, 0.923880-j0.382681, 0.740950+j0.87156-j0.032682, 0.740950+j0.87156-j0.032682, 0.740950+j0.87156-j0.032682, 0.740950+j0.07106-j0.07260-j0.032680-j0.382681-j0.923879-j0.932680-j0.382681, 0.982786-j0.049066, 0.902062-j0.000000, 0.989176, 0.707105-j0.707108-j0.923890-j0.382683, 0.46733-j0.989176, 0.326881-j0.923880, 0.938796-j0.049065, 0.932880-j0.382686, 0.989176-j0.146733, 1.000000+j0.000000, 0.999796-j0.923880-j0.382683, 0.427555-j0.903989, 0.707107-j0.707107-j0.0707107-		
0.989176-j0.146731, 0.000000-j1.000000, 0.989795-j0.049067, 0.000000-j1.000000, 0.989176-j0.14673 0.3826844-j0.923879, 0.740951+j0.671569-j0.9238890-j0.328360, 0.146731-j0.989176, -0.382683-j0.923880, 0.740951-j0.049067, 1.00000-j0.000001, 0.989176-j0.146731, 0.923879-j0.382684, 0.989176-j0.049067, 1.000000-j0.000001, 0.989176-j0.146731, 0.923879-j0.382684, 0.740950-j0.671560, 0.032683-j0.923880, 0.740950-j0.07106-j0.07106-j0.000001, 0.989176-j0.146731, 0.923879-j0.382684, 0.740950-j0.671560, 0.032683-j0.923880, 0.989176-j0.146732, 0.000002+j0.0000001, 0.989176-j0.049065, 0.000002+j0.000001, 0.989176-j0.146732-j0.989176, 0.07002-j0.0000001, 0.989796-j0.049966, 0.000002+j0.000000, 0.989176-j0.146732, 0.032685+j0.923879, 0.740950-j0.671561, 0.923880-j0.382682, 0.146733-j0.989176, 0.322681+j0.923887, 0.989789-j0.049065, 0.00002+j0.000000, 0.989176-j0.07106-j0.07108, 0.989789-j0.049065, 0.00002+j0.000000, 0.989176-j0.07106-j0.07108, 0.989789-j0.049065, 0.00002+j0.000000, 0.989176, 0.00000+j0.000000, 0.989789-j0.049065, 0.00002+j0.000000, 0.989177-j0.146733, 1.00000-j0.000000, 0.998789-j0.049065, 0.00002+j0.000000, 0.989177-j0.146733, 0.00002+j0.000000, 0.998789-j0.0427555, 0.930889, 0.32684+j0.923879, 0.5895700+j0.803207, 0.923880-j0.382683, 0.427555-j0.903898, 0.707107-j0.989177-j0.146730, 0.707107-j0.707107-j0.70107-j0.70107-j0.989177-j0.146730, 0.00001-j0.00000, 0.998187-j0.146730, 0.00001-j0.00000, 0.998187-j0.0427555-j0.000001-j0.00000, 0.98917-j0.0427555-j0.000001-j0.00000, 0.98917-j0.0427555-j0.000001-j0.00000, 0.98917-j0.042755-j0.000001-j0.00000, 0.98917-j0.042755-j0.000002-j0.000002, 0.98988-j0.042755-j0.000001-j0.000000, 0.98917-j0.04275-j0.000001-j0.0000002, 0.98918-j0.000001-j0.0000001-j0.000002, 0.98918-j0.000001-j0.000001-j0.000002, 0.98918-j0.000001-j0.	ľ	
0.382684-j.0.923879, 0.740951+j0.671559, -0.923886+j0.382683, 0.146731+j0.989176, -0.382683-j0.923880, 0.740951+j0.671569, -0.923879+j0.382684, 0.989176+j0.146731, -1.000000-j0.000001, 0.98978-j0.049671660, -1.000001-j0.000001, 0.989176+j0.146731, -1.000000-j0.000001, 0.98978-j0.049670, -7.000000-j0.000001, 0.989176-j0.146732-j0.989176, 0.923879-j0.382684, 0.740950+j0.671560, 0.382683-j0.923879, -0.389176-j0.146732-j0.989176, 0.923870-j0.382682, 0.740950+j0.671560, 0.382685-j0.923879, -0.989176-j0.146732, -0.000002+j1.000000, 0.998796-j0.049066, 0.000002-j1.000000, 0.989176-j0.146732, -0.09856+j0.923879, -0.740950+j0.671560, 0.322880+j0.382682, 0.146733+j0.989176, 0.707105+j0.707108, -0.98796+j0.049065, 0.000002-j1.000000, 0.989176-j0.476732, -0.3826849, 9.923879, 0.740950+j0.671560, 0.3228879+j0.382682, 0.146733+j0.989176-j0.049065, 0.000000+j0.000000, 0.9398949-j0.982765, 0.382681+j0.923889, 0.749694+j0.671561, 0.923879+j0.382686, 0.989176+j0.146733, 1.000000+j0.000000+j0.000000, 0.939389+j0.427555, 0.923683-j0.923896, 0.595699+j0.803208, -0.923880-j0.382683, 0.4275555-j0.903898, 0.707107+j0.707107, -0.989177+j0.146730, 0.707107-j0.707107, 0.427555-j0.000000+j1.0000000, 0.93891875-j0.446730, 0.79108-j0.2707108, 0.427555-j0.903898, 0.328649-j0.23880+j0.382683, -0.959700+j0.803207, -0.3826841-j0.93389, 0.328644-j0.923879, 0.427556-j0.903898, 0.923879-j0.382864-j0.93388-j0.382684-j0.93388+j0.382685, 0.595701+j0.803207, -0.382682-j0.932881-j0.382684, 0.93388+j0.382685, 0.595701+j0.803207, -0.382682-j0.932881-j0.382684, 0.932881-j0.382684, 0.932881-j0.382684, 0.932881-j0.382685, 0.595701-j0.803207, -0.382682-j0.932881-j0.382684, 0.707104-j0.707108, 0.427555-j0.903898, 0.932881-j0.382684, 0.707104-j0.707109, 0.9388177-j0.146728, -1.000000-j0.000002, 0.93388177-j0.146728, -1.000000-j0.000002, 0.93388177-j0.146728, -1.000000-j0.000002, 0.933881-j0.382684, 0.707104-j0.00000, 0.932887-j0.932884, 0.375661, 0.932887-j0.382684, 0.275661, 0.932889-j0.382684, 0.932877-j0.382680, -0.932877-j0.382680, -0.932877-j0.382680, -0		j0.707107, 0.146731-j0.989176, 0.923880-j0.382683, 0.740951+j0.671559, -0.382684+j0.923879, -
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$\begin{array}{c} 0.382683+j0.923880, -0.514102-j0.857729, -0.000001+j1.000000, 0.941545-j0.336889, 0.000001-j1.000000, -0.514101-j0.857729, -0.382682-j0.923880, 0.427557-j0.903988, 0.923879+j0.382685, -0.857730+j0.514101, 0.707109-j0.707105, -0.941545+j0.336887, 0.707105+j0.707109, 0.857730-j0.514100, 0.382687-j0.923878, 0.427559-j0.903988, 0.923881-j0.382679, 0.514099+j0.857731, -1.000000-j0.000005, 0.941546-j0.336885, -1.000000-j0.000006, 0.514098+j0.857732, 0.923882-j0.382678, 0.427561-j0.903986, 0.382690-j0.923877, 0.857732-j0.514096, 0.707101+j0.707112, -0.941547+j0.336882, 0.707113-j0.707101, -0.857733+j0.514095, 0.923876+j0.382692, 0.427564-j0.903985, -0.382674-j0.923883, -0.514094-j0.857734, 0.000011-j1.000000, 0.941548-j0.336879, -0.000012+j1.000000, -0.514092-j0.857735, 0.382671+j0.923885, 0.427567-j0.903983, -0.923874-j0.382697, -0.857736+j0.514090, -0.707118+j0.707096, -0.941549+j0.336875, -0.707095-j0.707118, 0.857737-j0.514088, -0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 $		
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$\begin{array}{c} 0.382690\text{-}j0.923877,\ 0.857732\text{-}j0.514096,\ 0.707101\text{+}j0.707112,\ -0.941547\text{+}j0.336882,\ 0.707113\text{-}\\ j0.707101,\ -0.857733\text{+}j0.514095,\ 0.923876\text{+}j0.382692,\ 0.427564\text{-}j0.903985,\ -0.382674\text{-}j0.923883,\ -}\\ 0.514094\text{-}j0.857734,\ 0.000011\text{-}j1.000000,\ 0.941548\text{-}j0.336879,\ -0.000012\text{+}j1.000000,\ -0.514092\text{-}\\ j0.857735,\ 0.382671\text{+}j0.923885,\ 0.427567\text{-}j0.903983,\ -0.923874\text{-}j0.382697,\ -0.857736\text{+}j0.514090,\ -}\\ 0.707118\text{+}j0.707096,\ -0.941549\text{+}j0.336875,\ -0.707095\text{-}j0.707118,\ 0.857737\text{-}j0.514088,\ -}\\ 0.382700\text{+}j0.923873,\ 0.427572\text{-}j0.903981,\ -0.923887\text{+}j0.382666,\ 0.514086\text{+}j0.857739,\ 1.000000\text{+}j0.000020,\ 0.941551\text{-}j0.336870}\\ p_{P4} & 1.000000\text{+}j0.0000000,\ 0.242980\text{+}j0.970031,\ -0.923880\text{-}j0.382683,\ 0.941544\text{+}j0.336890,\ -0.382683\text{-}}\\ j0.923880,\ -0.970031\text{+}j0.242980,\ -0.707107\text{+}j0.707107,\ -0.903989\text{+}j0.427555,\ -0.707106\text{-}j0.707107,\ -}\\ \end{array}$		
j0.707101, -0.857733+j0.514095, 0.923876+j0.382692, 0.427564-j0.903985, -0.382674-j0.923883, - 0.514094-j0.857734, 0.000011-j1.000000, 0.941548-j0.336879, -0.000012+j1.000000, -0.514092- j0.857735, 0.382671+j0.923885, 0.427567-j0.903983, -0.923874-j0.382697, -0.857736+j0.514090, - 0.707118+j0.707096, -0.941549+j0.336875, -0.707095-j0.707118, 0.857737-j0.514088, - 0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 PP4 1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683- j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
0.514094-j0.857734, 0.000011-j1.000000, 0.941548-j0.336879, -0.000012+j1.000000, -0.514092-j0.857735, 0.382671+j0.923885, 0.427567-j0.903983, -0.923874-j0.382697, -0.857736+j0.514090, -0.707118+j0.707096, -0.941549+j0.336875, -0.707095-j0.707118, 0.857737-j0.514088, -0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 PP4		
j0.857735, 0.382671+j0.923885, 0.427567-j0.903983, -0.923874-j0.382697, -0.857736+j0.514090, - 0.707118+j0.707096, -0.941549+j0.336875, -0.707095-j0.707118, 0.857737-j0.514088, - 0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 PP4 1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683- j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
0.707118+j0.707096, -0.941549+j0.336875, -0.707095-j0.707118, 0.857737-j0.514088, - 0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 p _{P4} 1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683- j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
0.382700+j0.923873, 0.427572-j0.903981, -0.923887+j0.382666, 0.514086+j0.857739, 1.000000+j0.000020, 0.941551-j0.336870 p _{P4} 1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683-j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
1.000000+j0.000020, 0.941551-j0.336870 p _{P4} 1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683-j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
j0.923880, -0.970031+j0.242980, -0.707107+j0.707107, -0.903989+j0.427555, -0.707106-j0.707107,		
	p _{P4}	1.000000+j0.000000, 0.242980+j0.970031, -0.923880-j0.382683, 0.941544+j0.336890, -0.382683-
0.970031-j0.242980, -0.923880+j0.382683, 0.941544+j0.336891, 0.382684-j0.923879, -0.242979-		
		0.970031-j0.242980, -0.923880+j0.382683, 0.941544+j0.336891, 0.382684-j0.923879, -0.242979-

	j0.970032, 0.000001-j1.000000, 0.903990-j0.427554, -0.000002+j1.000000, -0.242978-j0.970032, -
	0.382686+j0.923879, 0.941543+j0.336892, 0.923881-j0.382681, 0.970032-j0.242977,
	0.707104+j0.707109, -0.903991+j0.427552, 0.707110-j0.707104, -0.970032+j0.242976,
	0.382679+j0.923881, 0.941542+j0.336895, 0.923877+j0.382688, 0.242974+j0.970033, -1.000000-
	j0.000006, 0.903992-j0.427549, -1.000000-j0.000007, 0.242973+j0.970033, 0.923876+j0.382691,
	0.941541+j0.336898, 0.382675+j0.923883, -0.970034+j0.242971, 0.707114-j0.707100, -
	0.903994+j0.427546, 0.707099+j0.707115, 0.970034-j0.242969, 0.923884-j0.382672,
	0.941540+j0.336902, -0.382696+j0.923874, -0.242967-j0.970035, -0.000014+j1.000000, 0.903996-
	j0.427542, 0.000016-j1.000000, -0.242964-j0.970035, 0.382699-j0.923873, 0.941538+j0.336906, -
	0.923887+j0.382667, 0.970036-j0.242962, -0.707093-j0.707121, -0.903998+j0.427537, -
	0.707122+j0.707092, -0.970037+j0.242959, -0.382662-j0.923888, 0.941536+j0.336912, -0.923870-
	j0.382706, 0.242956+j0.970037, 1.000000+j0.000026, 0.904001-j0.427531
P _{P5}	1.000000+j0.000000, -0.049068+j0.998795, -0.382683-j0.923880, -0.242980+j0.970031,
	0.923879+j0.382684, 0.998795+j0.049068, 0.707107+j0.707107, -0.857729+j0.514102, 0.707107-
	j0.707106, -0.998795-j0.049068, -0.382684+j0.923879, -0.242981+j0.970031, -0.923880+j0.382682,
	0.049069-j0.998795, -0.000002+j1.000000, 0.857730-j0.514101, 0.000002-j1.000000, 0.049070-j0.998795,
	0.923881-j0.382681, -0.242983+j0.970030,
	0.382687-j0.923878, -0.998795-j0.049072, -0.707110+j0.707104, -0.857731+j0.514099, -0.707103-
	j0.707110, 0.998795+j0.049073, -0.923877-j0.382689, -0.242986+j0.970030, 0.382677+j0.923882, -
	0.049075+j0.998795, -1.000000-j0.000008, 0.857733-j0.514096, -1.000000-j0.000009, -
	0.049077+j0.998795, 0.382674+j0.923883, -0.242990+j0.970029, -0.923875-j0.382694,
	0.998795+j0.049079, -0.707098-j0.707115, -0.857735+j0.514092, -0.707116+j0.707097, -0.998795-
	j0.049082, 0.382697-j0.923874, -0.242995+j0.970028, 0.923886-j0.382669, 0.049085-j0.998795,
	0.000018-j1.000000, 0.857738-j0.514087,
	-0.000019+j1.000000, 0.049088-j0.998794, -0.923887+j0.382664, -0.243001+j0.970026, -
	0.382704+j0.923871, -0.998794-j0.049091, 0.707124-j0.707090, -0.857741+j0.514081,
	0.707088+j0.707125, 0.998794+j0.049094, 0.923869+j0.382709, -0.243008+j0.970024, -0.382656-
	j0.923891, -0.049098+j0.998794, 1.000000+j0.000032, 0.857745-j0.514075
P _{P6}	1.000000+j0.000000, -0.336890+j0.941544, 0.382684-j0.923880, -0.989176-j0.146731, -
	0.923880+j0.382683, -0.941544-j0.336890, 0.707107-j0.707106, -0.803208+j0.595699,
	0.707106+j0.707107, 0.941544+j0.336891, 0.382682+j0.923880, -0.989176-j0.146732,
	0.923879+j0.382685, 0.336892-j0.941543, 0.000002-j1.000000, 0.803209-j0.595697, -
	0.000003+j1.000000, 0.336893-j0.941543, -0.923878-j0.382687, -0.989176-j0.146734, -0.382680-
	j0.923881, 0.941543+j0.336894, -0.707103-j0.707110, -0.803211+j0.595695, -0.707111+j0.707103, -
	0.941542-j0.336896, 0.923882-j0.382677, -0.989175-j0.146738, -0.382691+j0.923877, -
	0.336898+j0.941541, -1.000000-j0.000009, 0.803213-j0.595692, -1.000000-j0.000010, -
	0.336900+j0.941540, -0.382694+j0.923875, -0.989175-j0.146743, 0.923884-j0.382672, -0.941539-
	j0.336903, -0.707117+j0.707097, -0.803217+j0.595687, -0.707096-j0.707118, 0.941538+j0.336906, -
	0.382667-j0.923886, -0.989174-j0.146749, -0.923872-j0.382701, 0.336909-j0.941537, -
	0.000021+j1.000000, 0.803220-j0.595682, 0.000023-j1.000000, 0.336912-j0.941536, 0.923870+j0.382706,
	-0.989173-j0.146756, 0.382659+j0.923890, 0.941535+j0.336916, 0.707087+j0.707127, -
	0.803225+j0.595676, 0.707128-j0.707085, -0.941533-j0.336920, -0.923892+j0.382653, -0.989172-
	j0.146764, 0.382716-j0.923866, -0.336924+j0.941532, 1.000000+j0.000037, 0.803231-j0.595668
P _{P7}	1.000000+j0.000000, -0.595699+j0.803208, 0.923880-j0.382683, 0.049068-j0.998795, 0.382684-
	j0.923879, 0.803207+j0.595700, -0.707106-j0.707107, -0.740952+j0.671558, -0.707107+j0.707106, -
	0.803207-j0.595700, 0.923879+j0.382685, 0.049069-j0.998795, -0.382682-j0.923880, 0.595701-j0.803206,
	-0.000002+j1.000000, 0.740953-j0.671557, 0.000003-j1.000000, 0.595702-j0.803205,
	0.382680+j0.923881, 0.049072-j0.998795,
	-0.923878-j0.382688, -0.803204-j0.595704, 0.707111-j0.707103, -0.740955+j0.671554,
	0.707102+j0.707112, 0.803203+j0.595705, -0.382691+j0.923877, 0.049076-j0.998795, -
	0.923883+j0.382675, -0.595707+j0.803202, -1.000000-j0.000010, 0.740959-j0.671551, -1.000000-
	j0.000012, -0.595709+j0.803200, -0.923885+j0.382671, 0.049082-j0.998795, -0.382697+j0.923874,
	0.803198+j0.595712, 0.707095+j0.707118, -0.740963+j0.671546, 0.707120-j0.707094, -0.803196-
	j0.595715, -0.923872-j0.382702, 0.049089-j0.998794, 0.382663+j0.923888, 0.595718-j0.803194,
	0.000024-j1.000000, 0.740968-j0.671540, -0.000026+j1.000000, 0.595721-j0.803191, -0.382657-
	j0.923890, 0.049097-j0.998794, 0.923868+j0.382712, -0.803189-j0.595725, -0.707130+j0.707084, -
	0.740974+j0.671534, -0.707082-j0.707132, 0.803186+j0.595729, 0.382718-j0.923865, 0.049107-
	[0.998794, 0.923895-in 382646 -0.595733+in 803183 1.000000+in 000043 0.740981-in 671526
n- :	0.923895-j0.382646, -0.595733+j0.803183, 1.000000+j0.000043, 0.740981-j0.671526
P _{P8}	1.000000+j0.000000, -0.803208+j0.595699, 0.923879+j0.382684, 0.998795-j0.049067, 0.382683+j0.923880, -0.595699-j0.803208, -0.707107+j0.707106, -0.671560+j0.740951, -0.707106-
	[0.362683+j0.923680, -0.595698+j0.803208, 0.923880-j0.382682, 0.998796-j0.049066, -0.382685+j0.923879,
	[]0.803209-j0.595697, 0.000003-j1.000000, 0.671561-j0.740949, -0.000004+j1.000000, 0.803210-j0.595696,
	0.382688-j0.923878, 0.998796-j0.049063, -0.923882+j0.382678, 0.595695+j0.803211,
	0.362666-j0.923676, 0.996796-j0.049063, -0.923662+j0.362676, 0.595693+j0.603211, 0.707102+j0.707111, -0.671564+j0.740946, 0.707112-j0.707101, -0.595693-j0.803212, -0.382675-
	[0.923883, 0.998796-j0.049058, -0.923876-j0.382693, -0.803214+j0.595690, -1.000000-j0.000012,
	[]0.923663, 0.996796-]0.049036, -0.923676-]0.362693, -0.603214+]0.393690, -1.000000-]0.000012,
	[0.041368-j0.140945, -1.000000-j0.000015, -0.803216+j0.393666, -0.923874-j0.362697, 0.998790- [j0.049052, -0.382668-j0.923886, -0.595685-j0.803218, 0.707120-j0.707094, -0.671574+j0.740938,

	0.707092+j0.707121, 0.595682+j0.803220, -0.923888+j0.382662, 0.998797-j0.049044, 0.382706-
	j0.923870, 0.803223-j0.595678, -0.000027+j1.000000, 0.671580-j0.740932,
	0.000030-j1.000000, 0.803226-j0.595675, -0.382713+j0.923867, 0.998797-j0.049034,
	0.923893-j0.382651, 0.595670+j0.803229, -0.707080-j0.707133, -0.671588+j0.740925, -
	0.707135+j0.707078, -0.595666-j0.803232, 0.382644+j0.923896, 0.998798-j0.049023,
	0.923862+j0.382726, -0.803236+j0.595661, 1.000000+j0.000049, 0.671596-j0.740917
p_{P9}	1.000000+j0.000000, -0.941544+j0.336890, 0.382683+j0.923880, 0.146730+j0.989177, -0.923879-
	j0.382684, 0.336889+j0.941544, 0.707106+j0.707107, -0.595700+j0.803207, 0.707108-j0.707106, -
	0.336889-j0.941545, 0.382685-j0.923879, 0.146729+j0.989177,
	0.923880-j0.382681, 0.941545-j0.336887, -0.000003+j1.000000, 0.595702-j0.803205,
	0.000004-j1.000000, 0.941546-j0.336886, -0.923881+j0.382679, 0.146725+j0.989177, -
	0.382689+j0.923877, -0.336884-j0.941546, -0.707112+j0.707102, -0.595706+j0.803203, -0.707101-
	j0.707113, 0.336881+j0.941547, 0.923876+j0.382693, 0.146720+j0.989178, -0.382673-j0.923884, -
	0.941548+j0.336878, -1.000000-j0.000013, 0.595711-j0.803199, -1.000000-j0.000015, -
	0.941549+j0.336875, -0.382668-j0.923886, 0.146713+j0.989179, 0.923872+j0.382701,
	0.336871+j0.941551, -0.707092-j0.707122, -0.595717+j0.803194, -0.707123+j0.707090, -0.336867-
	j0.941552, -0.382707+j0.923870, 0.146704+j0.989180, -0.923890+j0.382658, 0.941554-j0.336862,
	0.000030-j1.000000, 0.595725-j0.803189, -0.000033+j1.000000, 0.941556-j0.336857, 0.923893-j0.382650,
	0.146694+j0.989182, 0.382719-j0.923865, -0.336852-j0.941558, 0.707136-j0.707077, -
	0.595734+j0.803182, 0.707075+j0.707138, 0.336846+j0.941560, -0.923861-j0.382728,
	0.146681+j0.989184, 0.382636+j0.923899, -0.941562+j0.336840, 1.000000+j0.000055, 0.595745-
	j0.803174
P _{P10}	1.000000+j0.000000, -0.998795+j0.049068, -0.382684+j0.923879, -0.970031+j0.242980, 0.923880-
	j0.382683, -0.049067-j0.998795, 0.707107-j0.707106, -0.514104+j0.857728, 0.707106+j0.707108,
	0.049066+j0.998796, -0.382682-j0.923880, -0.970032+j0.242978, -0.923879-j0.382686, 0.998796-
	j0.049065, 0.000003-j1.000000, 0.514106-j0.857727, -0.000004+j1.000000, 0.998796-j0.049063,
	0.923877+j0.382688, -0.970033+j0.242974, 0.382677+j0.923882, 0.049060+j0.998796, -0.707101-
	j0.707112, -0.514110+j0.857724, -0.707114+j0.707100, -0.049057-j0.998796, -0.923884+j0.382673, -
	0.970034+j0.242969, 0.382695-j0.923875, -0.998796+j0.049054, -1.000000-j0.000015, 0.514116-
	j0.857721, -1.000000-j0.000017, -0.998796+j0.049050, 0.382701-j0.923872, -0.970036+j0.242961, -
	0.923888+j0.382664, -0.049046-j0.998797, -0.707123+j0.707090, -0.514124+j0.857716, -0.707089-
	j0.707125, 0.049041+j0.998797, 0.382657+j0.923890, -0.970038+j0.242952, 0.923868+j0.382712,
	0.998797-j0.049036, -0.000034+j1.000000, 0.514133-j0.857711, 0.000037-j1.000000, 0.998797-j0.049030,
	-0.923864-j0.382720, -0.970041+j0.242940, -0.382644-j0.923896, 0.049023+j0.998798,
	0.707074+j0.707139, -0.514144+j0.857704, 0.707142-j0.707072, -0.049017-j0.998798, 0.923900-
	'0 00000
	j0.382634, -0.970045+j0.242927, -0.382736+j0.923858, -0.998798+j0.049009, 1.000000+j0.000060,
	0.514156-j0.857697
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, -
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, -
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545,
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005-
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690,
P _{P11}	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, -
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028-
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999,
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025,
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024,
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.940014, 0.000037-
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923868+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, -
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923868+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, - 0.336847-j0.941559, -0.923862-j0.382727, 0.243027-j0.970019, -0.707142+j0.707071, -
PP11	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923868+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, - 0.336847-j0.941559, -0.923862-j0.382727, 0.243027-j0.970019, -0.707142+j0.707071, - 0.427602+j0.903967, -0.707068-j0.707145, -0.243035+j0.970018, -0.382737+j0.923857, -0.336833-
	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923868+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, - 0.336847-j0.941559, -0.923862-j0.382727, 0.243027-j0.970019, -0.707142+j0.707071, - 0.427602+j0.903967, -0.707068-j0.707145, -0.243035+j0.970018, -0.382737+j0.923857, -0.336833- j0.941564, -0.923903+j0.382626, -0.970016-j0.243042, 1.000000+j0.000066, 0.427617-j0.903960
PP12	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.707106-j0.707107, -0.427556+j0.903989, - 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242988-j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923868+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, - 0.336847-j0.941559, -0.923862-j0.382727, 0.243027-j0.970019, -0.707142+j0.707071, - 0.427602+j0.903967, -0.707068-j0.707145, -0.243035+j0.970018, -0.382737+j0.923857, -0.336833- j0.941564, -0.923903+j0.382626, -0.970016-j0.243042, 1.000000+j0.000066, 0.427617-j0.903960 1.000000+j0.000000, -0.857729-j0.514103, -0.923879-j0.382684, 0.903989-j0.427555, -0.382683-
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	0.514156-j0.857697 1.000000+j0.000000, -0.970031-j0.242980, -0.923880+j0.382683, -0.336890-j0.941544, - 0.382684+j0.923879, -0.242981+j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.707108+j0.707106, 0.242982-j0.970031, -0.923879-j0.382685, -0.336888-j0.941545, 0.382681+j0.923881, 0.970030+j0.242983, -0.000004+j1.000000, 0.427559-j0.903987, 0.000005- j1.000000, 0.970030+j0.242985, -0.382678-j0.923882, -0.336884-j0.941546, 0.923877+j0.382690, 0.242989+j0.970029, 0.707113-j0.707101, -0.427564+j0.903985, 0.707099+j0.707114, - 0.242991+j0.970029, 0.382695-j0.923875, -0.336878-j0.941548, 0.923885-j0.382670, -0.970028- j0.242995, -1.000000-j0.000016, 0.427571-j0.903982, -1.000000-j0.000018, -0.970027-j0.242999, 0.923887-j0.382665, -0.336870-j0.941551, 0.382705-j0.923871, -0.243004+j0.970025, 0.707089+j0.707125, -0.427579+j0.903978, 0.707127-j0.707087, 0.243009-j0.970024, 0.923886+j0.382712, -0.336859-j0.941555, -0.382652-j0.923892, 0.970023+j0.243014, 0.000037- j1.000000, 0.427590-j0.903973, -0.000040+j1.000000, 0.970021+j0.243021, 0.382643+j0.923896, - 0.336847-j0.941559, -0.923862-j0.382727, 0.243027-j0.970019, -0.707142+j0.707071, - 0.427602+j0.903967, -0.707068-j0.707145, -0.243035+j0.970018, -0.382737+j0.923857, -0.336833- j0.941564, -0.923903+j0.3826626, -0.970016-j0.243042, 1.000000+j0.000066, 0.427617-j0.903960 1.00000+j0.000000, -0.857729-j0.514103, -0.923879-j0.382684, 0.903989-j0.427555, -0.382683- j0.923880, 0.514103-j0.857728, -0.923861, 0.903990-j0.4275549, 0.923883-j0.382666, - 0.514104+j0.857724, 0.707100+j0.382671, 0.903990-j0.4275549, 0.923883-j0.382666, - 0.514110+j0.857724, 0.707100+j0.707114, -0.336900+j0.941541, 0.707115-j0.707099, 0.514113- j0.857722, 0.3826771+j0.923885, 0.903995-j0.4275542, 0.923889, 0.857725, 0.514121, 0.923871+j0.93856, 0.903999-j0.427553, 0.3826661+j0.923889, 0.514125-j0.857718, 0.514121, 0.923871+j0.382704, 0.903999-j0.427534, 0.382661+j0.923889, 0.514125-j0.857715, 0.514121, 0.923861, 0.904010-j0.427511, -0.923899+j0.382666, - 0.514130+j0.8577718, 0.000040-j0.00
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P _{P13}	1.000000+j0.000000, -0.671559-j0.740951, -0.382683-j0.923880, 0.514102+j0.857729, 0.923879+j0.382684, -0.740952+j0.671558, 0.707106+j0.707107, -0.242981+j0.970031, 0.707108-j0.707106, 0.740952-j0.671558, -0.382686+j0.923879, 0.514100+j0.857730, -0.923881+j0.382680, 0.671556+j0.740954, -0.000004+j1.000000, 0.242985-j0.970030, 0.000006-j1.000000,
	0.671554+j0.740954, -0.000004+j1.000000, 0.242965-j0.970030, 0.0000006-j1.0000000, 0.671554+j0.740955, 0.923882-j0.382677, 0.514096+j0.857733, 0.382691-j0.923876, 0.740957-j0.671552, -0.707114+j0.707099, -0.242991+j0.970029, -0.707098-
	j0.707115, -0.740960+j0.671549, -0.923874-j0.382697, 0.514090+j0.857736, 0.382668+j0.923886, -0.671546-j0.740963, -1.000000-j0.000019, 0.243000-j0.970026, -1.000000-j0.000021, -0.671542-
	j0.740966, 0.382661+j0.923889, 0.514081+j0.857742, -0.923869-j0.382708, -0.740970+j0.671538, -0.707086-j0.707128, -0.243011+j0.970024, -0.707130+j0.707084, 0.740974-j0.671533, 0.382717-
	j0.923866, 0.514070+j0.857748, 0.923895-j0.382647, 0.671528+j0.740979, 0.000043-j1.000000, 0.243024-j0.970020, -0.000047+j1.000000, 0.671523+j0.740984, -0.923899+j0.382636,
	0.514057+j0.857756, -0.382734+j0.923858, 0.740989-j0.671517, 0.707149-j0.707065, - 0.243040+j0.970016, 0.707062+j0.707152, -0.740995+j0.671510, 0.923853+j0.382746, 0.514042+j0.857765, -0.382616-j0.923907, -0.671503-j0.741002, 1.000000+j0.000078, 0.243058-
	j0.970012
P _{P14}	1.000000+j0.000000, -0.427555-j0.903989, 0.382684-j0.923879, -0.803208+j0.595699, - 0.923880+j0.382683, 0.903990-j0.427554, 0.707107-j0.707106, -0.146732+j0.989176,
	0.707106+j0.707108, -0.903990+j0.427553, 0.382681+j0.923880, -0.803209+j0.595697, 0.923878+j0.382687, 0.427551+j0.903991, 0.000005-j1.000000, 0.146736-j0.989176, -
	0.000006+j1.000000, 0.427549+j0.903992, -0.923877-j0.382690, -0.803213+j0.595693, -0.382675-
	j0.923883, -0.903994+j0.427546, -0.707099-j0.707115, -0.146742+j0.989175, -0.707116+j0.707098, 0.903995-j0.427542, 0.923885-j0.382669, -0.803217+j0.595686, -0.382700+j0.923873, -0.427538-
	j0.903997, -1.000000-j0.000020, 0.146752-j0.989173, -1.000000-j0.000023, -0.427533-j0.904000, - 0.382707+j0.923870, -0.803224+j0.595677, 0.923891-j0.382657, 0.904002-j0.427528, -
	0.707129+j0.707084, -0.146764+j0.989172, -0.707082-j0.707132, -0.904005+j0.427522, -0.382648-j0.923894, -0.803232+j0.595667, -0.923863-j0.382723, 0.427515+j0.904008, -0.000046+j1.000000,
	0.146778-j0.989169, 0.000050-j1.000000, 0.427508+j0.904012, 0.923859+j0.382734, -
	0.803241+j0.595654, 0.382629+j0.923902, -0.904016+j0.427500, 0.707062+j0.707152, - 0.146796+j0.989167, 0.707155-j0.707058, 0.904020-j0.427491, -0.923908+j0.382616, -
P _{P15}	0.803253+j0.595639, 0.382756-j0.923850, -0.427482-j0.904024, 1.000000+j0.000083, 0.146816-j0.989164 1.000000+j0.000000, -0.146730-j0.989177, 0.923880-j0.382683, -0.671559-j0.740951, 0.382684-
PF 15	j0.923879, -0.989177+j0.146730, -0.707106-j0.707108, -0.049069+j0.998795, -0.707108+j0.707106, 0.989177-j0.146728, 0.923879+j0.382686, -0.671557-j0.740953, -0.382680-j0.923881,
	0.146726+j0.989177, -0.000005+j1.000000, 0.049073-j0.998795, 0.000006-j1.000000,
	0.146723+j0.989178, 0.382676+j0.923883, -0.671552-j0.740957, -0.923876-j0.382693, 0.989178- j0.146720, 0.707115-j0.707098, -0.049081+j0.998795, 0.707097+j0.707117, -0.989179+j0.146715, -
	0.382699+j0.923873, -0.671546-j0.740963, -0.923887+j0.382666, -0.146710-j0.989179, -1.000000-j0.000022, 0.049091-j0.998794, -1.000000-j0.000024, -0.146705-j0.989180, -0.923890+j0.382658, -
	0.671537-j0.740971, -0.382712+j0.923868, -0.989181+j0.146698, 0.707083+j0.707131, -0.049104+j0.998794, 0.707133-j0.707080, 0.989182-j0.146691, -0.923864-j0.382722, -0.671527-
	j0.740980, 0.382641+j0.923897, 0.146683+j0.989183, 0.000050-j1.000000, 0.049119-j0.998793, -
	0.000054+j1.000000, 0.146675+j0.989185, -0.382629-j0.923902, -0.671514-j0.740992, 0.923855+j0.382742, 0.989186-j0.146666, -0.707155+j0.707059, -0.049138+j0.998792, -0.707055-
	j0.707158, -0.989188+j0.146656, 0.382756-j0.923850, -0.671499-j0.741005, 0.923912-j0.382606, -0.146645-j0.989189, 1.000000+j0.000089, 0.049160-j0.998791
p _{P16}	1.000000+j0.000000, 0.146731-j0.989176, 0.923879+j0.382684, 0.671559-j0.740951, 0.382683+j0.923880, 0.989176+j0.146731, -0.707108+j0.707106, 0.049066+j0.998796, -0.707105-
	j0.707108, -0.989176-j0.146733, 0.923881-j0.382681, 0.671561-j0.740949, -0.382687+j0.923878, -
	0.146735+j0.989176, 0.000005-j1.000000, -0.049062-j0.998796, -0.000007+j1.000000, - 0.146738+j0.989175, 0.382691-j0.923876, 0.671566-j0.740945, -0.923884+j0.382674, -0.989175-
	j0.146742, 0.707098+j0.707116, 0.049054+j0.998796, 0.707117-j0.707096, 0.989174+j0.146746, - 0.382667-j0.923886, 0.671573-j0.740939, -0.923872-j0.382702, 0.146752-j0.989173, -1.000000-j0.000023,
	-0.049043-j0.998797, -1.000000-j0.000026, 0.146758-j0.989172, -0.923868-j0.382710, 0.671582-j0.740930, -0.382653-j0.923892, 0.989171+j0.146765, 0.707133-j0.707081, 0.049029+j0.998797,
	0.707078+j0.707135, -0.989170-j0.146772, -0.923896+j0.382643, 0.671593-j0.740920, 0.382728-
	j0.923861, -0.146781+j0.989169, -0.000053+j1.000000, -0.049013-j0.998798, 0.000057-j1.000000, - 0.146790+j0.989168, -0.382741+j0.923856, 0.671607-j0.740908, 0.923905-j0.382621, -0.989166-
	j0.146799, -0.707056-j0.707158, 0.048993+j0.998799, -0.707162+j0.707052, 0.989165+j0.146810, 0.382606+j0.923911, 0.671623-j0.740893, 0.923845+j0.382766, 0.146821-j0.989163,
	1.000000+j0.000095, -0.048970-j0.998800
р _{Р17}	1.000000+j0.000000, 0.427555-j0.903989, 0.382683+j0.923880, 0.803207+j0.595700, -0.923879-j0.382684, -0.903989-j0.427556, 0.707106+j0.707108, 0.146729+j0.989177, 0.707108-j0.707105,
	0.903988+j0.427557, 0.382686-j0.923878, 0.803205+j0.595702, 0.923881-j0.382679, -0.427560+j0.903987, -0.000006+j1.000000, -0.146724-j0.989177, 0.000007-
	j1.000000, -0.427563+j0.903986, -0.923883+j0.382675, 0.803201+j0.595707, -0.382694+j0.923875, 0.903984+j0.427566, -0.707116+j0.707097, 0.146716+j0.989179, -0.707096-j0.707118, -0.903982-
	j0.427571, 0.923872+j0.382701, 0.803196+j0.595715, -0.382664-j0.923888, 0.427576-j0.903980, -

	1.000000-j0.000024, -0.146705-j0.989180, -1.000000-j0.000028, 0.427582-j0.903977, -0.382655-
	j0.923891, 0.803188+j0.595726, 0.923866+j0.382716, -0.903974-j0.427588, -0.707080-j0.707134,
	0.146690+j0.989182, -0.707137+j0.707077, 0.903970+j0.427596, -0.382727+j0.923862,
	0.803178+j0.595739, -0.923899+j0.382636, -0.427604+j0.903966, 0.000056-j1.000000, -0.146673-
	j0.989185, -0.000061+j1.000000, -0.427612+j0.903962, 0.923905-j0.382622, 0.803167+j0.595754,
	0.382749-j0.923852, 0.903958+j0.427622, 0.707161-j0.707053, 0.146652+j0.989188,
	0.707048+j0.707165, -0.903953-j0.427632, -0.923846-j0.382765, 0.803153+j0.595773,
	0.382596+j0.923916, 0.427643-j0.903948, 1.000000+j0.000101, -0.146628-j0.989192
P _{P18}	1.000000+j0.000000, 0.671559-j0.740951, -0.382684+j0.923879, -0.514103+j0.857728, 0.923880-
	j0.382683, 0.740950+j0.671560, 0.707108-j0.707106, 0.242979+j0.970032, 0.707105+j0.707108, -0.740949-j0.671561, -0.382680-j0.923881, -0.514106+j0.857727, -0.923878-
	[0.382688, -0.671563+j0.740948, 0.000006-j1.000000, -0.242974-j0.970033, -0.000008+j1.000000, -
	[0.671565+j0.740945, 0.923876+j0.382692, -0.514112+j0.857723, 0.382673+j0.923884, -0.740942-
	j0.671569, -0.707097-j0.707117, 0.242965+j0.970035, -0.707119+j0.707095, 0.740939+j0.671572, -
	0.923887+j0.382665, -0.514121+j0.857718, 0.382704-j0.923871, 0.671577-j0.740935, -1.000000-
	j0.000026, -0.242954-j0.970038, -1.000000-j0.000029, 0.671582-j0.740930, 0.382714-j0.923867, -
	0.514133+j0.857711, -0.923894+j0.382650, 0.740925+j0.671588, -0.707136+j0.707078,
	0.242939+j0.970042, -0.707075-j0.707139, -0.740919-j0.671594, 0.382638+j0.923899, -
	0.514147+j0.857702, 0.923859+j0.382734, -0.671601+j0.740913, -0.000059+j1.000000, -0.242920-
	j0.970046, 0.000064-j1.000000, -0.671609+j0.740906, -0.923853-j0.382748, -0.514165+j0.857691, -
	0.382614-j0.923908, -0.740899-j0.671617, 0.707049+j0.707164, 0.242899+j0.970052, 0.707168-
	j0.707045, 0.740891+j0.671626, 0.923915-j0.382597, -0.514186+j0.857679, -0.382776+j0.923841,
	0.671635-j0.740882, 1.000000+j0.000106, -0.242874-j0.970058
P _{P19}	1.000000+j0.000000, 0.857729-j0.514103, -0.923880+j0.382683, -0.903989-j0.427555, -
	0.382684+j0.923879, -0.514102-j0.857729, -0.707106-j0.707108, 0.336888+j0.941545, -
	0.707108+j0.707105, 0.514100+j0.857730, -0.923878-j0.382687, -0.903988-j0.427559,
	0.382679+j0.923881, -0.857731+j0.514098, -0.000006+j1.000000, -0.336883-j0.941546, 0.000008-
	j1.000000, -0.857733+j0.514095, -0.382674-j0.923883, -0.903984-j0.427565, 0.923875+j0.382695,
	0.514091+j0.857736, 0.707117-j0.707096, 0.336875+j0.941550, 0.707094+j0.707119, -0.514086-
	j0.857738, 0.382702-j0.923872, -0.903980-j0.427575, 0.923889-j0.382661, 0.857742-j0.514081, -
	1.000000-j0.000027, -0.336863-j0.941554, -1.000000-j0.000031, 0.857745-j0.514075, 0.923893-j0.382651,
	-0.903974-j0.427588,
	0.382719-j0.923865, -0.514068-j0.857750, 0.707076+j0.707137, 0.336847+j0.941559, 0.707140-
	j0.707073, 0.514060+j0.857754, 0.923860+j0.382732, -0.903966-j0.427605, -0.382631-j0.923901, - 0.857759+j0.514051, 0.000062-j1.000000, -0.336829-j0.941566, -0.000068+j1.000000, -
	0.857765+j0.514042, 0.382615+j0.923908, -0.903957-j0.427624, -0.923849-j0.382757,
	0.537765+j0.514042; 0.582615+j0.525968; -0.5855957-j0.427624; -0.5925645-j0.582757; 0.514032+j0.857771; -0.707167+j0.707046; 0.336806+j0.941574; -0.707042-j0.707172; -0.514021-
	j0.857778, -0.382774+j0.923842, -0.903946-j0.427647, -0.923920+j0.382586, 0.857784-j0.514010,
	1.000000+j0.000112, -0.336781-j0.941583
p _{P20}	1.000000+j0.000000, 0.970031-j0.242980, -0.923879-j0.382684, 0.336890-j0.941544, -0.382683-
1 20	j0.923880, 0.242979+j0.970032, -0.707108+j0.707106, 0.427553+j0.903990, -0.707105-j0.707108, -
	0.242977-j0.970032, -0.923881+j0.382680, 0.336894-j0.941543, 0.382688-j0.923878, -
	0.970033+j0.242975, 0.000007-j1.000000, -0.427548-j0.903993, -0.000009+j1.000000, -
	0.970034+j0.242971, -0.382693+j0.923875, 0.336901-j0.941540, 0.923885-j0.382671, -0.242966-
	j0.970035, 0.707096+j0.707118, 0.427540+j0.903997, 0.707120-j0.707094, 0.242961+j0.970036,
	0.382663+j0.923888, 0.336912-j0.941536,
	0.923870+j0.382707, 0.970038-j0.242954, -1.000000-j0.000029, -0.427528-j0.904002, -1.000000-
	j0.000032, 0.970040-j0.242947, 0.923866+j0.382717, 0.336926-j0.941531, 0.382646+j0.923895,
	0.242939+j0.970042, 0.707139-j0.707075, 0.427512+j0.904010, 0.707071+j0.707142, -0.242929-
	j0.970044, 0.923901-j0.382633, 0.336944-j0.941525, -0.382739+j0.923857, -0.970047+j0.242919, -
	0.000066+j1.000000, -0.427493-j0.904019, 0.000071-j1.000000, -0.970049+j0.242908, 0.382755-
	j0.923850, 0.336966-j0.941517, -0.923911+j0.382606, -0.242896-j0.970052, -0.707043-j0.707170,
	0.427471+j0.904029, -0.707175+j0.707038, 0.242883+j0.970056, -0.382588-j0.923919, 0.336991-j0.941508, -0.923837-j0.382786, 0.970059-j0.242869, 1.000000+j0.000118, -0.427445-j0.904041
<u> </u>	1.000000+j0.000000, 0.998795+j0.049068, -0.382683-j0.923880, 0.970031+j0.242981,
P _{P21}	
I	0.923879+j0.382684, 0.049069-j0.998795, 0.707106+j0.707108, 0.514101+j0.857730,
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, -
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, -0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009-
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, -0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009-j1.000000, -0.998795-j0.049078, 0.923884-j0.382673, 0.970028+j0.242992,
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, - 0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009- j1.000000, -0.998795-j0.049078, 0.923884-j0.382673, 0.970028+j0.242992, 0.382696-j0.923874, -0.049083+j0.998795, -0.707118+j0.707095, 0.514087+j0.857738, -0.707093-
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, - 0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009- j1.000000, -0.998795-j0.049078, 0.923884-j0.382673, 0.970028+j0.242992, 0.382696-j0.923874, -0.049083+j0.998795, -0.707118+j0.707095, 0.514087+j0.857738, -0.707093- j0.707121, 0.049089-j0.998794, -0.923871-j0.382704, 0.970025+j0.243004, 0.382659+j0.923890,
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, - 0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009- j1.000000, -0.998795-j0.049078, 0.923884-j0.382673, 0.970028+j0.242992, 0.382696-j0.923874, -0.049083+j0.998795, -0.707118+j0.707095, 0.514087+j0.857738, -0.707093- j0.707121, 0.049089-j0.998794, -0.923871-j0.382704, 0.970025+j0.243004, 0.382659+j0.923890, 0.998794+j0.049096, -1.000000-j0.000030, -0.514075-j0.857745, -1.000000-j0.000034,
	0.707109-j0.707105, -0.049071+j0.998795, -0.382687+j0.923878, 0.970030+j0.242985, - 0.923882+j0.382679, -0.998795-j0.049074, -0.000007+j1.000000, -0.514096-j0.857733, 0.000009- j1.000000, -0.998795-j0.049078, 0.923884-j0.382673, 0.970028+j0.242992, 0.382696-j0.923874, -0.049083+j0.998795, -0.707118+j0.707095, 0.514087+j0.857738, -0.707093- j0.707121, 0.049089-j0.998794, -0.923871-j0.382704, 0.970025+j0.243004, 0.382659+j0.923890,
	$\begin{array}{c} 0.707109\text{-j}0.707105, -0.049071\text{+j}0.998795, -0.382687\text{+j}0.923878, 0.970030\text{+j}0.242985, -0.923882\text{+j}0.382679, -0.998795\text{-j}0.049074, -0.000007\text{+j}1.000000, -0.514096\text{-j}0.857733, 0.000009\text{-j}1.000000, -0.998795\text{-j}0.049078, 0.923884\text{-j}0.382673, 0.970028\text{+j}0.242992, 0.382696\text{-j}0.923874, -0.049083\text{+j}0.998795, -0.707118\text{+j}0.707095, 0.514087\text{+j}0.857738, -0.707093\text{-j}0.707121, 0.049089\text{-j}0.998794, -0.923871\text{-j}0.382704, 0.970025\text{+j}0.243004, 0.382659\text{+j}0.923890, 0.998794\text{+j}0.049096, -1.000000\text{-j}0.000030, -0.514075\text{-j}0.857745, -1.000000\text{-j}0.000034, 0.998794\text{+j}0.049104, 0.382648\text{+j}0.923894, 0.970021\text{+j}0.243019, -0.923863\text{-j}0.382723, 0.049113\text{-j}0.998793, -0.707073\text{-j}0.707140, 0.514060\text{+j}0.857754, -0.707144\text{+j}0.707070, -0.049123\text{+j}0.998793, 0.382737\text{-j}0.923857, 0.970017\text{+j}0.243039, 0.923904\text{-j}0.382625, -0.998792\text{-j}0.049134, 0.000069\text{-j}1.000000, \end{array}$
	$\begin{array}{c} 0.707109\text{-j}0.707105, -0.049071\text{+j}0.998795, -0.382687\text{+j}0.923878, 0.970030\text{+j}0.242985, -0.923882\text{+j}0.382679, -0.998795\text{-j}0.049074, -0.000007\text{+j}1.000000, -0.514096\text{-j}0.857733, 0.000009\text{-j}1.000000, -0.998795\text{-j}0.049078, 0.923884\text{-j}0.382673, 0.970028\text{+j}0.242992, 0.382696\text{-j}0.923874, -0.049083\text{+j}0.998795, -0.707118\text{+j}0.707095, 0.514087\text{+j}0.857738, -0.707093\text{-j}0.707121, 0.049089\text{-j}0.998794, -0.923871\text{-j}0.382704, 0.970025\text{+j}0.243004, 0.382659\text{+j}0.923890, 0.998794\text{+j}0.049096, -1.000000\text{-j}0.000030, -0.514075\text{-j}0.857745, -1.000000\text{-j}0.000034, 0.998794\text{+j}0.049104, 0.382648\text{+j}0.923894, 0.970021\text{+j}0.243019, -0.923863\text{-j}0.382723, 0.049113\text{-j}0.998793, -0.707073\text{-j}0.707140, 0.514060\text{+j}0.857754, -0.707144\text{+j}0.707070, -0.049123\text{+j}0.998793, 0.382737\text{-j}0.923857, 0.970017\text{+j}0.243039, 0.923904\text{-j}0.382625, -0.998792\text{-j}0.049134, 0.000069\text{-j}1.000000, -0.514041\text{-j}0.857766, -0.000075\text{+j}1.000000, -0.998792\text{-j}0.049146, -0.923911\text{+j}0.382609, \end{array}$
	$\begin{array}{c} 0.707109\text{-j}0.707105, -0.049071\text{+j}0.998795, -0.382687\text{+j}0.923878, 0.970030\text{+j}0.242985, -0.923882\text{+j}0.382679, -0.998795\text{-j}0.049074, -0.000007\text{+j}1.000000, -0.514096\text{-j}0.857733, 0.000009\text{-j}1.000000, -0.998795\text{-j}0.049078, 0.923884\text{-j}0.382673, 0.970028\text{+j}0.242992, 0.382696\text{-j}0.923874, -0.049083\text{+j}0.998795, -0.707118\text{+j}0.707095, 0.514087\text{+j}0.857738, -0.707093\text{-j}0.707121, 0.049089\text{-j}0.998794, -0.923871\text{-j}0.382704, 0.970025\text{+j}0.243004, 0.382659\text{+j}0.923890, 0.998794\text{+j}0.049096, -1.000000\text{-j}0.000030, -0.514075\text{-j}0.857745, -1.000000\text{-j}0.000034, 0.998794\text{+j}0.049104, 0.382648\text{+j}0.923894, 0.970021\text{+j}0.243019, -0.923863\text{-j}0.382723, 0.049113\text{-j}0.998793, -0.707073\text{-j}0.707140, 0.514060\text{+j}0.857754, -0.707144\text{+j}0.707070, -0.049123\text{+j}0.998793, 0.382737\text{-j}0.923857, 0.970017\text{+j}0.243039, 0.923904\text{-j}0.382625, -0.998792\text{-j}0.049134, 0.000069\text{-j}1.000000, \end{array}$

	0.970004+j0.243089, -0.382576-j0.923924, 0.998790+j0.049187, 1.000000+j0.000124, -0.513993-j0.857794
PP22	1.000000+j0.000000, 0.941544+j0.336890, 0.382684-j0.923879, -0.146731+j0.989176, - 0.923880+j0.382683, -0.336891+j0.941544, 0.707108-j0.707106, 0.595698+j0.803209,
	0.707105+j0.707109, 0.336893-j0.941543, 0.382680+j0.923881, -0.146735+j0.989176,
	0.923877+j0.382688, -0.941542-j0.336896, 0.000007-j1.000000, -0.595693-j0.803212, -
	0.000009+j1.000000, -0.941541-j0.336900, -0.923875-j0.382694, -0.146743+j0.989175, -0.382670-
	j0.923885, 0.336905-j0.941539, -0.707095-j0.707119, 0.595684+j0.803219, -0.707121+j0.707092, -
	0.336911+j0.941537, 0.923889-j0.382661, -0.146756+j0.989173, -0.382709+j0.923869,
	0.941534+j0.336917, -1.000000-j0.000031, -0.595672-j0.803227, -1.000000-j0.000036, 0.941531+j0.336925, -0.382720+j0.923864, -0.146772+j0.989170, 0.923897-j0.382642, -
	0.336934+j0.941528, -0.707142+j0.707072, 0.595657+j0.803239, -0.707068-j0.707146, 0.336944-
	j0.941525, -0.382628-j0.923903, -0.146793+j0.989167, -0.923854-j0.382744, -0.941521-j0.336955, -
	0.000072+j1.000000, -0.595639-j0.803252, 0.000078-j1.000000, -0.941517-j0.336967,
	0.923847+j0.382762, -0.146818+j0.989164, 0.382599+j0.923915, 0.336979-j0.941512,
	0.707037+j0.707177, 0.595617+j0.803268,
	0.707182-j0.707032, -0.336993+j0.941507, -0.923923+j0.382579, -0.146847+j0.989159, 0.382796-
	j0.923833, 0.941502+j0.337008, 1.000000+j0.000129, -0.595592-j0.803287
p _{P23}	1.000000+j0.000000, 0.803207+j0.595699, 0.923880-j0.382683, -0.998795-j0.049068, 0.382684-
	j0.923879, 0.595700-j0.803207, -0.707106-j0.707108, 0.671557+j0.740953, -0.707109+j0.707105, -
	0.595702+j0.803206, 0.923878+j0.382687, -0.998795-j0.049073, -0.382678-j0.923882, -0.803204-
	j0.595705, -0.000008+j1.000000, -0.671553-j0.740957, 0.000010-j1.000000, -0.803201-j0.595708,
	0.382672+j0.923884, -0.998795-j0.049081, -0.923874-j0.382697, -0.595713+j0.803198, 0.707120-j0.707094, 0.671544+j0.740964, 0.707092+j0.707122, 0.595718-j0.803194, -0.382706+j0.923870, -
	0.998794-j0.049094, -0.923890+j0.382657, 0.803189+j0.595724, -1.000000-j0.000033, -0.671533-
	j0.740975, -1.000000-j0.000037, 0.803184+j0.595731, -0.923895+j0.382645, -0.998793-j0.049112, -
	0.382727+j0.923862, 0.595739-j0.803178, 0.707070+j0.707143, 0.671519+j0.740988, 0.707147-
	j0.707066, -0.595748+j0.803172, -0.923855-j0.382742, -0.998792-j0.049134, 0.382620+j0.923906, -
	0.803165-j0.595757, 0.000075-j1.000000, -0.671501-j0.741004, -0.000082+j1.000000, -0.803157-
	j0.595768, -0.382602-j0.923913, -0.998791-j0.049160, 0.923843+j0.382772, -0.595779+j0.803148, -
	0.707180+j0.707034, 0.671480+j0.741023, -0.707029-j0.707185, 0.595791-j0.803139, 0.382793-
	j0.923834, -0.998789-j0.049190,
	0.923928-j0.382566, 0.803130+j0.595805, 1.000000+j0.000135, -0.671456-j0.741045
P _{P24}	1.000000+j0.000000, 0.595699+j0.803208, 0.923879+j0.382684, -0.049067-j0.998795,
	0.382683+j0.923880, -0.803208+j0.595698, -0.707108+j0.707106, 0.740950+j0.671561, -0.707105-j0.707109, 0.803210-j0.595696, 0.923881-j0.382679, -0.049063-j0.998796, -0.382689+j0.923877, -
	0.595694-j0.803212, 0.000008-j1.000000, -0.740945-j0.671566, -0.000010+j1.000000, -0.595690-
	j0.803214, 0.382695-j0.923875, -0.049054-j0.998796, -0.923886+j0.382669, 0.803218-j0.595686,
	0.707094+j0.707120, 0.740937+j0.671574, 0.707122-j0.707091, -0.803222+j0.595680, -0.382660-
	j0.923889, -0.049040-j0.998797, -0.923868-j0.382711, 0.595674+j0.803227, -1.000000-j0.000034, -
	0.740927-j0.671586, -1.000000-j0.000039, 0.595666+j0.803232, -0.923863-j0.382724, -0.049022-
	j0.998798, -0.382639-j0.923898, -0.803238+j0.595658, 0.707145-j0.707069, 0.740913+j0.671601,
	0.707065+j0.707149, 0.803245-j0.595649, -0.923905+j0.382623, -0.048999-j0.998799, 0.382750-
	j0.923852, -0.595639-j0.803252, -0.000078+j1.000000, -0.740896-j0.671620, 0.000085-j1.000000, -
	0.595628-j0.803260, -0.382769+j0.923844, -0.048972-j0.998800, 0.923918-j0.382591, 0.803269-
PP25	j0.595616, -0.707031-j0.707183, 0.740876+j0.671641, -0.707188+j0.707025, -0.803279+j0.595603,
	0.382569+j0.923927, -0.048940-j0.998802, 0.923829+j0.382806, 0.595590+j0.803289, 1.000000+j0.000141, -0.740853-j0.671667
	1.000000+j0.000000, 0.336890+j0.941544, 0.382683+j0.923880, 0.989177-j0.146730, -0.923879-
	j0.382684, 0.941545-j0.336889, 0.707106+j0.707108, 0.803206+j0.595701, 0.707109-j0.707105, -
	0.941545+j0.336886, 0.382688-j0.923878, 0.989177-j0.146725,
	0.923882-j0.382678, -0.336883-j0.941546, -0.000008+j1.000000, -0.803202-j0.595707, 0.000011-
	j1.000000, -0.336879-j0.941548, -0.923885+j0.382671, 0.989179-j0.146716, -0.382698+j0.923873, -
	0.941550+j0.336873, -0.707121+j0.707093, 0.803195+j0.595716, -0.707090-j0.707123, 0.941552-
	j0.336866, 0.923869+j0.382708, 0.989181-j0.146702, -0.382655-j0.923891, 0.336859+j0.941555, -
	1.000000-j0.000036, -0.803185-j0.595730, -1.000000-j0.000040, 0.336850+j0.941558, -0.382642-
	j0.923897, 0.989184-j0.146683, 0.923860+j0.382730, 0.941562-j0.336840, -0.707067-j0.707147,
	0.803172+j0.595747, -0.707151+j0.707063, -0.941566+j0.336828, -0.382747+j0.923853, 0.989187-
	j0.146660, -0.923908+j0.382614, -0.336816-j0.941570, 0.000082-j1.000000, -0.803157-j0.595768, - 0.000089+j1.000000, -0.336803-j0.941575, 0.923916-j0.382595, 0.989191-j0.146632, 0.382779-j0.923840,
	-0.941580+j0.336788, 0.707186-j0.707028, 0.803138+j0.595792, 0.707022+j0.707192, 0.941586-
	j0.336773, -0.923830-j0.382802, 0.989196-j0.146599, 0.382556+j0.923932, 0.336756+j0.941592,
	1.000000+j0.000147, -0.803117-j0.595821
P _{P26}	1.000000+j0.000000, 0.049068+j0.998795, -0.382684+j0.923879, 0.242980+j0.970031, 0.923880-
	j0.382683, -0.998796+j0.049066, 0.707108-j0.707105, 0.857727+j0.514105, 0.707105+j0.707109,
	0.998796-j0.049064, -0.382679-j0.923881, 0.242975+j0.970033, -0.923877-j0.382689, -0.049060-
	j0.998796, 0.000009-j1.000000, -0.857724-j0.514111, -0.000011+j1.000000, -0.049055-j0.998796,
	0.923874+j0.382696, 0.242965+j0.970035, 0.382668+j0.923886, 0.998796-j0.049049, -0.707092-

(0.707721, 0.8577174)0.514122, -0.707124-0.707090, -0.9897974-0.049042, -0.923890+0.987974, -0.0000000-0.000003, -0.857708-0.10514136, -1.000000-0.10000042, 0.0490234-0.989789, 0.989789, 0.982784-0.100000042, 0.0490234-0.989789, 0.9827274, 0.923862, 0.24293224, 0.970043, -0.9239004-0.982865, -0.9987894, 0.049024, -0.090024, 1.0000000, -0.0587276, -0.04896-0.989799, 0.0000684-0.000000, -0.0587276, -0.04896-0.989799, 0.0000684-0.000000, -0.048972-0.098800, -0.92384-0.038776, 0.2428794-0.970056, -0.382544-0.923871, 0.938801-0.048956, -0.03854-0.038264-0.0382776, 0.2428794-0.970506, -0.382564-0.923871, 0.938801-0.048956, -0.03854-0.038264-0.0382		
0.24/2951-j0.970039, 0.382713-j0.923867, 0.49033-j0.998797, -1.000000-j0.000037, -0.857708-j0.923800, 0.923800-j0.032635, -0.998798-j0.049000, 2.0-0707148-j0.707065, 0.857687-j0.514165, -0.707061-j0.707752, 0.989789-j0.049000, 3.826184j0.923907, 0.429081-j0.707049, 0.9238504-j0.382765, -0.048986-j0.989789, -0.0000854j1.00000, -0.057683-j0.514179, 0.00002-j0.1000000, -0.048972-j0.989800, -0.923841-j0.382766, 0.242879-j0.970066, -0.325849-j0.923921, 0.998001-j0.048936, 0.707128-j0.707189, 0.857667-j0.514206, 0.707198-j0.70719, -0.9988024j0.048939, 0.923931-j0.382560, 0.242894-j0.3707065, -0.325816-j0.232825, 0.048929-j0.95803, 1.000000-j0.000153, -0.857648-j0.514238, -0.3282614-j0.32385, -0.048929-j0.958603, 1.000000-j0.000153, -0.857648-j0.514238, -0.328264-j0.32387-j0.328264-j0.323861-j0.32387-j0.328264-j0.323861		j0.707121, 0.857717+j0.514122, -0.707124+j0.707090, -0.998797+j0.049042, -0.923890+j0.382658,
0.514136, 1.000000-j0.000042, 0.049023-j0.998786, 0.92388277-j0.923886, 0.242932-j0.970043, - 0.923900-j0.382685, 0.998789-j0.040006, 0.3826184j0.923907, 0.2429084j0.970049, 0.923850+j0.382755, - 0.04986-j0.99879-j0.0000054-j1.000000, -0.95863-j0.514179, 0.0000052-j1.000000, -0.048972- j0.998800, 0.923841-j0.382776, 0.242879-j0.970056, -0.382584-j0.923921, 0.998801-j0.0489956, 0.7070254j0.07189, 0.8576674-j0.14206, 0.70718-j0.707194, 0.923851, 0.998801-j0.0489956, 0.7070254j0.07189, 0.8576674-j0.14206, 0.70718-j0.707194, 0.998801-j0.0489956, 0.382569, 0.2428449, 0.970055, -0.382816-j0.923825, 0.048920-j0.998803, 1.000000-j0.000153, - 0.857648-j0.51430, 0.9242989-j0.970031, -0.9238691-j0.382683, -0.941544-j0.35889, - 0.3826844j0.023807, 0.970031-j0.242984, -0.923878-j0.382683, -0.941544-j0.35889, - 0.382677-j0.923882, 0.242988-j0.970029, -0.0000911, 0.00000, -0.903988-j0.427564, 0.000011- j1.000000, 0.242993-j0.970028, -0.382870-j0.923885, -0.941546-j0.336876, 0.923873-j0.38277- 0.970027-j0.242999, 0.707122-j0.707922, 0.903973-j0.427562, -0.903988-j0.427564, 0.000011- j1.000000, 0.242993-j0.970028, -0.382670-j0.923885, -0.941546-j0.336876, 0.923873-j0.382700, - 0.970027-j0.242999, 0.707122-j0.707922, 0.903973-j0.427562, -1.00000-j0.000043, - 0.243025-j0.970020, 0.922888-j0.382638, -0.941554-j0.336860, 0.923873-j0.382652, - 0.243025-j0.970020, 0.922888-j0.382638, -0.941554-j0.358680, 0.923873-j0.382652, - 0.970017-j0.243002, 0.9706-j0.07018, 0.90398-j0.427654, -0.243159-j0.000043, - 0.923910, 0.243022, 0.970011, 0.00008-j0.00038, -0.90398-j0.427564, -0.244576-j0.338817, -0.382609- 0.923910, 0.243022, 0.970011, 0.00088-j0.04269, 0.3688-j0.038874, 0.388774, 0.970003- 0.023917-j0.040000-j0.00018, 0.90398-j0.427688, -0.707015-j0.707198, 0.96999-j0.243110, - 0.323812-j0.023866, 0.941562-j0.336916, 0.32686-j0.338646, -0.243814-j0.038877, 0.9100000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.00000-j0.0000		
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j0.337049		
PP29		
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$\begin{array}{c} 0.857788\text{-j}0.514004, -0.382794\text{+j}0.923834, -0.671467\text{-j}0.741035, 0.707198\text{-j}0.707015, \\ 0.969999\text{+j}0.243110, 0.707009\text{+j}0.707205, 0.671452\text{+j}0.741048, 0.923823\text{+j}0.382821, 0.857808\text{-j}0.513971, -0.382536\text{-j}0.923940, -0.741062\text{+j}0.671437, 1.000000\text{+j}0.000170, -0.969989\text{-j}0.243150} \\ p_{\text{P30}} & 1.000000\text{+j}0.000000, -0.903989\text{+j}0.427555, 0.382684\text{-j}0.923879, 0.595699\text{+j}0.803208, - \\ 0.923880\text{+j}0.382682, -0.427554\text{-j}0.903990, 0.707108\text{-j}0.707105, 0.989176\text{+j}0.146733, \\ 0.707104\text{+j}0.707109, 0.427551\text{+j}0.903991, 0.382679\text{+j}0.923882, 0.595694\text{+j}0.803211, \\ 0.923877\text{+j}0.382690, 0.903993\text{-j}0.427547, 0.000010\text{-j}1.000000, -0.989175\text{-j}0.146742, - \\ 0.000013\text{+j}1.000000, 0.903995\text{-j}0.427542, -0.923873\text{-j}0.382698, 0.595685\text{+j}0.803218, -0.382665\text{-j}0.923887, 0.427536\text{+j}0.903998, -0.707090\text{-j}0.707123, 0.989173\text{+j}0.146756, -0.707126\text{+j}0.707087, - \\ 0.427528\text{-j}0.904002, 0.923892\text{-j}0.382654, 0.595671\text{+j}0.803228, -0.382718\text{+j}0.923865, - \\ 0.904006\text{+j}0.427519, -1.000000\text{-j}0.000042, -0.989170\text{-j}0.146775, -1.000000\text{-j}0.000048, - \\ 0.904011\text{+j}0.427509, -0.382733\text{+j}0.923859, 0.595653\text{+j}0.803242, 0.923903\text{-j}0.382628, -0.427497\text{-} \\ \end{array}$		
$\begin{array}{l} 0.969999+j0.243110,\ 0.707009+j0.707205,\ 0.671452+j0.741048,\ 0.923823+j0.382821,\ 0.857808-j0.513971,\ -0.382536-j0.923940,\ -0.741062+j0.671437,\ 1.000000+j0.000170,\ -0.969989-j0.243150 \\ \hline p_{P30} & 1.000000+j0.000000,\ -0.903989+j0.427555,\ 0.382684-j0.923879,\ 0.595699+j0.803208,\ -0.923880+j0.382682,\ -0.427554-j0.903990,\ 0.707108-j0.707105,\ 0.989176+j0.146733,\ 0.707104+j0.707109,\ 0.427551+j0.903991,\ 0.382679+j0.923882,\ 0.595694+j0.803211,\ 0.923877+j0.382690,\ 0.903993-j0.427547,\ 0.000010-j1.000000,\ -0.989175-j0.146742,\ -0.000013+j1.000000,\ 0.903995-j0.427542,\ -0.923873-j0.382698,\ 0.595685+j0.803218,\ -0.382665-j0.923887,\ 0.427536+j0.903998,\ -0.707090-j0.707123,\ 0.989173+j0.146756,\ -0.707126+j0.707087,\ -0.427528-j0.904002,\ 0.923892-j0.382654,\ 0.595671+j0.803228,\ -0.382718+j0.923865,\ -0.904006+j0.427519,\ -1.000000-j0.000042,\ -0.989170-j0.146775,\ -1.000000-j0.000048,\ -0.904011+j0.427509,\ -0.382733+j0.923859,\ 0.595653+j0.803242,\ 0.923903-j0.382628,\ -0.427497-j0.427509,\ -0.382733+j0.923859,\ -0.595653+j0.803242,\ -0.923903-j0.382628,\ -0.427497-j0.427509,\ -0.382733+j0.427509,\ -0.382733+j0.427509,\ -0.382733+j0.427509,\ -0.38$		
$\begin{array}{l} 0.969999+j0.243110,\ 0.707009+j0.707205,\ 0.671452+j0.741048,\ 0.923823+j0.382821,\ 0.857808-j0.513971,\ -0.382536-j0.923940,\ -0.741062+j0.671437,\ 1.000000+j0.000170,\ -0.969989-j0.243150 \\ \hline p_{P30} & 1.000000+j0.000000,\ -0.903989+j0.427555,\ 0.382684-j0.923879,\ 0.595699+j0.803208,\ -0.923880+j0.382682,\ -0.427554-j0.903990,\ 0.707108-j0.707105,\ 0.989176+j0.146733,\ 0.707104+j0.707109,\ 0.427551+j0.903991,\ 0.382679+j0.923882,\ 0.595694+j0.803211,\ 0.923877+j0.382690,\ 0.903993-j0.427547,\ 0.000010-j1.000000,\ -0.989175-j0.146742,\ -0.000013+j1.000000,\ 0.903995-j0.427542,\ -0.923873-j0.382698,\ 0.595685+j0.803218,\ -0.382665-j0.923887,\ 0.427536+j0.903998,\ -0.707090-j0.707123,\ 0.989173+j0.146756,\ -0.707126+j0.707087,\ -0.427528-j0.904002,\ 0.923892-j0.382654,\ 0.595671+j0.803228,\ -0.382718+j0.923865,\ -0.904006+j0.427519,\ -1.000000-j0.000042,\ -0.989170-j0.146775,\ -1.000000-j0.000048,\ -0.904011+j0.427509,\ -0.382733+j0.923859,\ 0.595653+j0.803242,\ 0.923903-j0.382628,\ -0.427497-j0.427509,\ -0.382733+j0.923859,\ -0.595653+j0.803242,\ -0.923903-j0.382628,\ -0.427497-j0.427509,\ -0.382733+j0.427509,\ -0.382733+j0.427509,\ -0.382733+j0.427509,\ -0.38$		[0.857788-j0.514004, -0.382794+j0.923834, -0.671467-j0.741035, 0.707198-j0.707015,
$\begin{array}{c} j0.513971, \ -0.382536\text{-}j0.923940, \ -0.741062\text{+}j0.671437, \ 1.000000\text{+}j0.000170, \ -0.969989\text{-}j0.243150} \\ p_{\text{P30}} & 1.000000\text{+}j0.000000, \ -0.903989\text{+}j0.427555, \ 0.382684\text{-}j0.923879, \ 0.595699\text{+}j0.803208, \ -} \\ 0.923880\text{+}j0.382682, \ -0.427554\text{-}j0.903990, \ 0.707108\text{-}j0.707105, \ 0.989176\text{+}j0.146733, \ 0.707104\text{+}j0.707109, \ 0.427551\text{+}j0.903991, \ 0.382679\text{+}j0.923882, \ 0.595694\text{+}j0.803211, \ 0.923877\text{+}j0.382690, \ 0.903993\text{-}j0.427547, \ 0.000010\text{-}j1.000000, \ -0.989175\text{-}j0.146742, \ -} \\ 0.000013\text{+}j1.000000, \ 0.903995\text{-}j0.427542, \ -0.923873\text{-}j0.382698, \ 0.595685\text{+}j0.803218, \ -0.382665\text{-}j0.923887, \ 0.427536\text{+}j0.903998, \ -0.707090\text{-}j0.707123, \ 0.989173\text{+}j0.146756, \ -0.707126\text{+}j0.707087, \ -} \\ 0.427528\text{-}j0.904002, \ 0.923892\text{-}j0.382654, \ 0.595671\text{+}j0.803228, \ -0.382718\text{+}j0.923865, \ -} \\ 0.904006\text{+}j0.427519, \ -1.000000\text{-}j0.000042, \ -0.989170\text{-}j0.146775, \ -1.000000\text{-}j0.000048, \ -} \\ 0.904011\text{+}j0.427509, \ -0.382733\text{+}j0.923859, \ 0.595653\text{+}j0.803242, \ 0.923903\text{-}j0.382628, \ -0.427497\text{-} \end{array}$		
$\begin{array}{c} p_{\text{P30}} \\ \hline \\ 1.000000+j0.000000, -0.903989+j0.427555, 0.382684-j0.923879, 0.595699+j0.803208, -0.923880+j0.382682, -0.427554-j0.903990, 0.707108-j0.707105, 0.989176+j0.146733, 0.707104+j0.707109, 0.427551+j0.903991, 0.382679+j0.923882, 0.595694+j0.803211, 0.923877+j0.382690, 0.903993-j0.427547, 0.000010-j1.000000, -0.989175-j0.146742, -0.000013+j1.000000, 0.903995-j0.427542, -0.923873-j0.382698, 0.595685+j0.803218, -0.382665-j0.923887, 0.427536+j0.903998, -0.707090-j0.707123, 0.989173+j0.146756, -0.707126+j0.707087, -0.427528-j0.904002, 0.923892-j0.382654, 0.595671+j0.803228, -0.382718+j0.923865, -0.904006+j0.427519, -1.000000-j0.000042, -0.989170-j0.146775, -1.000000-j0.000048, -0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-$		
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0.707104+j0.707109, 0.427551+j0.903991, 0.382679+j0.923882, 0.595694+j0.803211, 0.923877+j0.382690, 0.903993-j0.427547, 0.000010-j1.000000, -0.989175-j0.146742, -0.000013+j1.000000, 0.903995-j0.427542, -0.923873-j0.382698, 0.595685+j0.803218, -0.382665-j0.923887, 0.427536+j0.903998, -0.707090-j0.707123, 0.989173+j0.146756, -0.707126+j0.707087, -0.427528-j0.904002, 0.923892-j0.382654, 0.595671+j0.803228, -0.382718+j0.923865, -0.904006+j0.427519, -1.000000-j0.000042, -0.989170-j0.146775, -1.000000-j0.000048, -0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-	P _{P30}	
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0.923877+j0.382690, 0.903993-j0.427547, 0.000010-j1.000000, -0.989175-j0.146742, - 0.000013+j1.000000, 0.903995-j0.427542, -0.923873-j0.382698, 0.595685+j0.803218, -0.382665- j0.923887, 0.427536+j0.903998, -0.707090-j0.707123, 0.989173+j0.146756, -0.707126+j0.707087, - 0.427528-j0.904002, 0.923892-j0.382654, 0.595671+j0.803228, -0.382718+j0.923865, - 0.904006+j0.427519, -1.000000-j0.000042, -0.989170-j0.146775, -1.000000-j0.000048, - 0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-		
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0.427528-j0.904002, 0.923892-j0.382654, 0.595671+j0.803228, -0.382718+j0.923865, - 0.904006+j0.427519, -1.000000-j0.000042, -0.989170-j0.146775, -1.000000-j0.000048, - 0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-		j0.923887, 0.427536+j0.903998, -0.707090-j0.707123, 0.989173+j0.1467560.707126+j0.707087
0.904006+j0.427519, -1.000000-j0.000042, -0.989170-j0.146775, -1.000000-j0.000048, - 0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-		
0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-		
		0.904011+j0.427509, -0.382733+j0.923859, 0.595653+j0.803242, 0.923903-j0.382628, -0.427497-
IIU.9040170.707134+I0.707039. 0.969166+I0.1468000.707054-I0.707159. 0.427485+I0.904023 -		j0.904017, -0.707154+j0.707059, 0.989166+j0.146800, -0.707054-j0.707159, 0.427485+j0.904023, -
0.382608-j0.923911, 0.595631+j0.803259, -0.923845-j0.382766, 0.904029-j0.427471, -		
0.002000- 0.02001-1, 0.000001-1,0.000200, -0.020040- 0.0021-00, 0.00402- 0.421-471, -		0.002000

	0.000098+j1.000000, -0.989162-j0.146831, 0.000106-j1.000000, 0.904037-j0.427455,
	0.923836+j0.382790, 0.595603+j0.803279,
	0.382569+j0.923927, 0.427439+j0.904044, 0.707012+j0.707201, 0.989156+j0.146868, 0.707208-
	j0.707005, -0.427421-j0.904053, -0.923938+j0.382541, 0.595571+j0.803302, 0.382835-j0.923817, -
	0.904062+j0.427401, 1.000000+j0.000176, -0.989150-j0.146910
p _{P31}	1.000000+j0.000000, -0.989177+j0.146730, 0.923880-j0.382683, -0.740952+j0.671558, 0.382684-
	j0.923879, 0.146729+j0.989177, -0.707105-j0.707108, 0.998795+j0.049071, -0.707109+j0.707104, -
	0.146726-j0.989177, 0.923877+j0.382688, -0.740956+j0.671554, -0.382676-j0.923882, 0.989178-
	j0.146722, -0.000010+j1.000000, -0.998795-j0.049079, 0.000013-j1.000000, 0.989179-j0.146716,
	0.382668+j0.923886, -0.740963+j0.671545, -0.923872-j0.382702, -0.146709-j0.989180, 0.707124-
	j0.707090, 0.998794+j0.049094, 0.707087+j0.707127, 0.146700+j0.989181, -0.382714+j0.923867, -
	0.740975+j0.671532, -0.923894+j0.382648, -0.989183+j0.146690, -1.000000-j0.000044, -0.998793-
	j0.049114, -1.000000-j0.000050, -0.989184+j0.146678, -0.923901+j0.382632, -0.740991+j0.671515, -
	0.382741+j0.923856, 0.146665+j0.989186, 0.707058+j0.707156, 0.998792+j0.049141, 0.707161-
	j0.707053, -0.146651-j0.989188, -0.923847-j0.382761, -0.741010+j0.671493, 0.382598+j0.923915,
	0.989191-j0.146635, 0.000101-j1.000000, -0.998790-j0.049173, -0.000110+j1.000000, 0.989193-
	j0.146618, -0.382574-j0.923925, -0.741034+j0.671467, 0.923830+j0.382802, -0.146599-j0.989196, -
	0.707204+j0.707009, 0.998788+j0.049211, -0.707002-j0.707212, 0.146578+j0.989199, 0.382830-
	j0.923819, -0.741062+j0.671437, 0.923945-j0.382526, -0.989202+j0.146557, 1.000000+j0.000181, -
	0.998786-j0.049255

AA.2 Association between Midambles and Channelisation Codes for default midamble allocation

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with *. These associations apply for both UL and DL.

AA.2.1 Association for K=16 Midambles

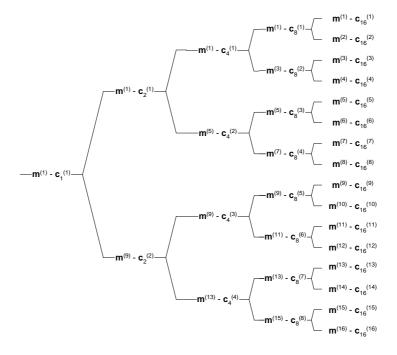


Figure AA.1: Association of Midambles to Spreading Codes for K=16

AA.2.2 Association for K=14 Midambles

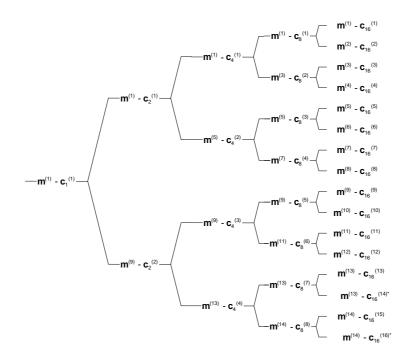


Figure AA.2: Association of Midambles to Spreading Codes for K=14

AA.2.3 Association for K=12 Midambles

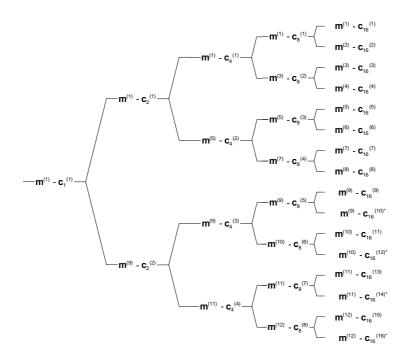


Figure AA.3: Association of Midambles to Spreading Codes for K=12

AA.2.4 Association for K=10 Midambles

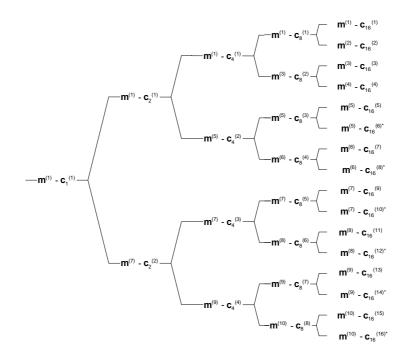


Figure AA.4: Association of Midambles to Spreading Codes for K=10

AA.2.5 Association for K=8 Midambles

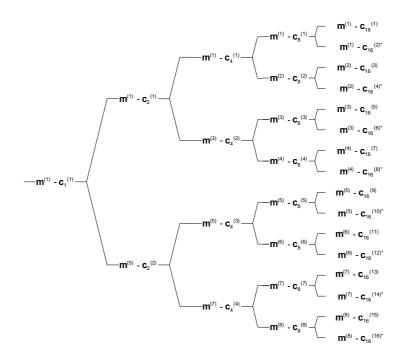


Figure AA.5: Association of Midambles to Spreading Codes for K=8

AA.2.6 Association for K=6 Midambles

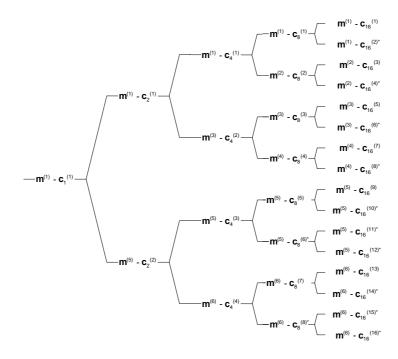


Figure AA.6: Association of Midambles to Spreading Codes for K=6

AA.2.7 Association for K=4 Midambles

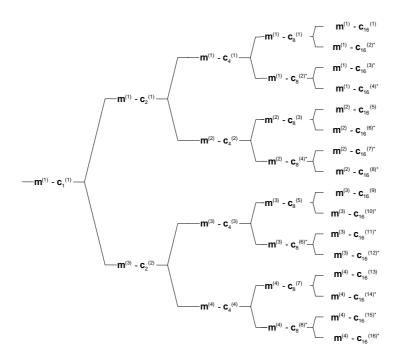


Figure AA.7: Association of Midambles to Spreading Codes for K=4

AA.2.8 Association for K=2 Midambles

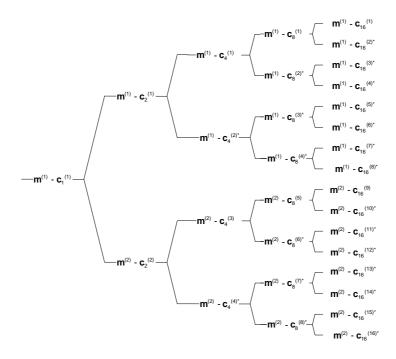


Figure AA.8: Association of Midambles to Spreading Codes for K=2

AA.3 Association between Midambles and Channelisation Codes for special default midamble allocation

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. Secondary channelisation codes are marked with *. These associations apply for both UL and DL.

AA.3.1 Association for K=16 Midambles

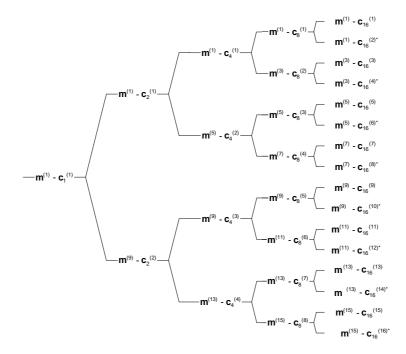


Figure AA.3.1a: Association of Midambles to Spreading Codes for K=16 pattern 1

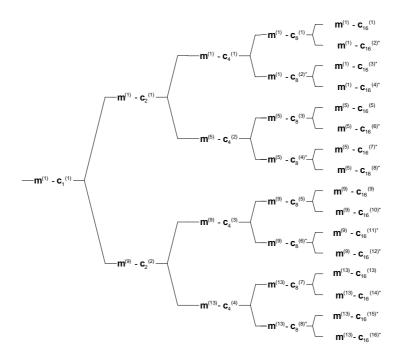


Figure AA.3.1aa: Association of Midambles to Spreading Codes for K=16 pattern 1A

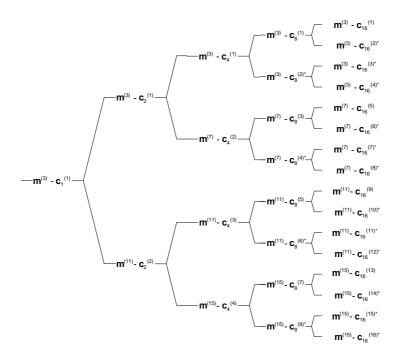


Figure AA.3.1ab: Association of Midambles to Spreading Codes for K=16 pattern 1B

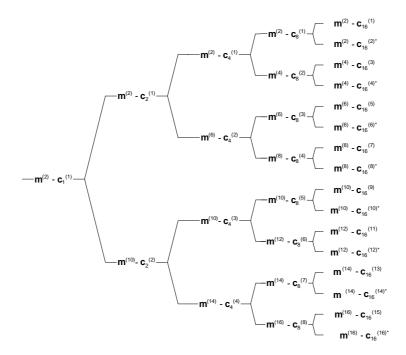


Figure AA.3.1b: Association of Midambles to Spreading Codes for K=16 pattern 2

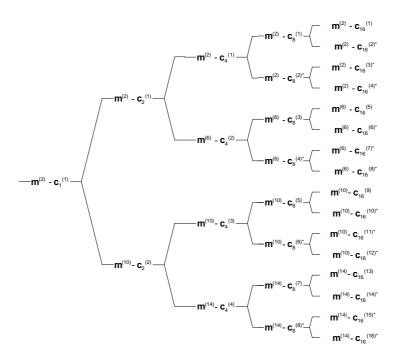


Figure AA.3.1ba: Association of Midambles to Spreading Codes for K=16 pattern 2A

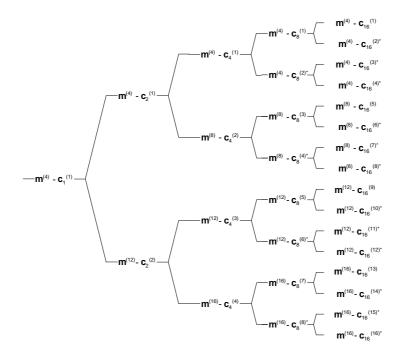


Figure AA.3.1bb: Association of Midambles to Spreading Codes for K=16 pattern 2B

AA.3.2 Association for K=14 Midambles

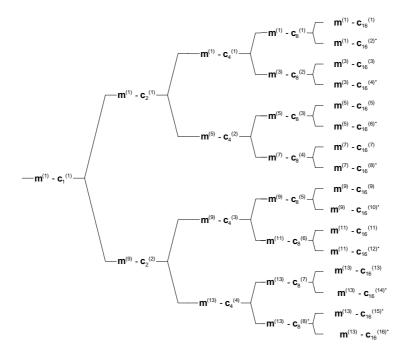


Figure AA.3.2a: Association of Midambles to Spreading Codes for K=14 pattern 1

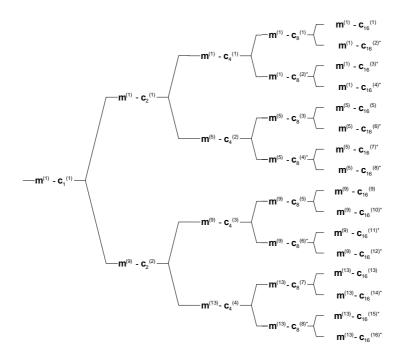


Figure AA.3.2aa: Association of Midambles to Spreading Codes for K=14 pattern 1A

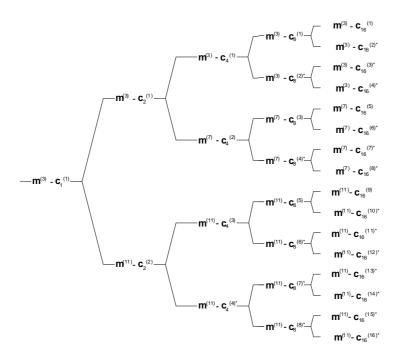


Figure AA.3.2ab: Association of Midambles to Spreading Codes for K=14 pattern 1B

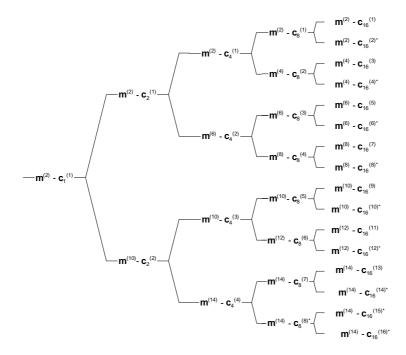


Figure AA.3.2b: Association of Midambles to Spreading Codes for K=14 pattern 2

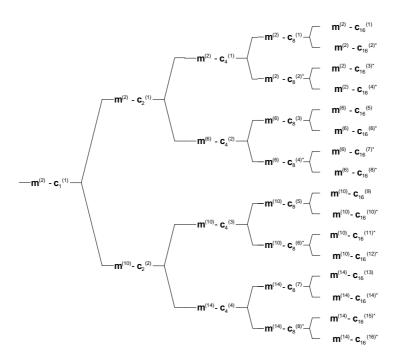


Figure AA.3.2ba: Association of Midambles to Spreading Codes for K=14 pattern 2A

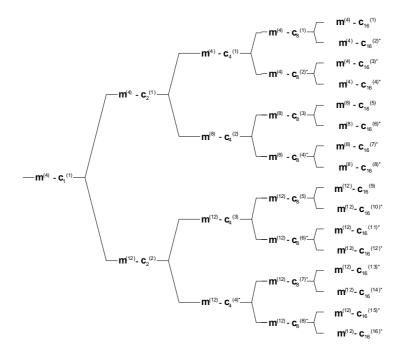


Figure AA.3.2bb: Association of Midambles to Spreading Codes for K=14 pattern 2B

AA.3.3 Association for K=12 Midambles

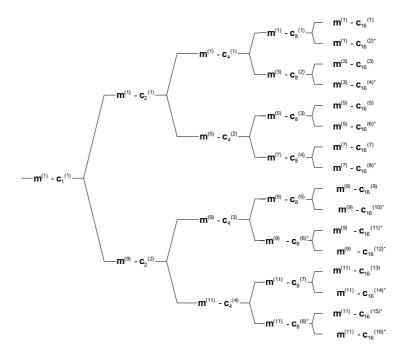


Figure AA.3.3a: Association of Midambles to Spreading Codes for K=12 pattern 1

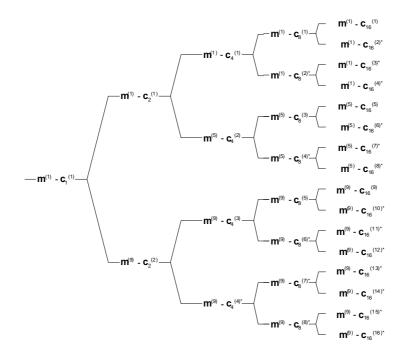


Figure AA.3.3aa: Association of Midambles to Spreading Codes for K=12 pattern 1A

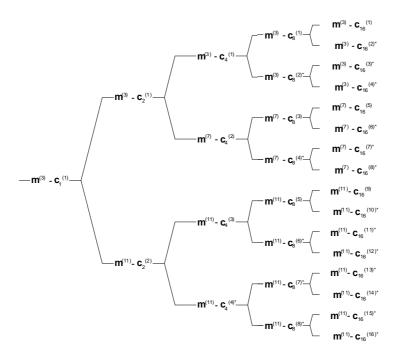


Figure AA.3.3ab: Association of Midambles to Spreading Codes for K=12 pattern 1B

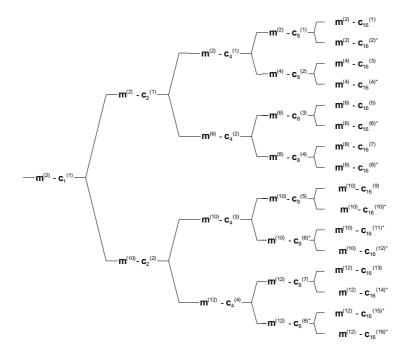


Figure AA.3.3b: Association of Midambles to Spreading Codes for K=12 pattern 2

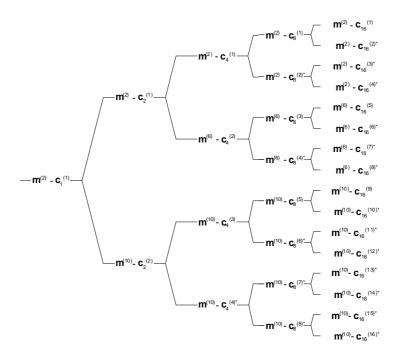


Figure AA.3.3ba: Association of Midambles to Spreading Codes for K=12 pattern 2A

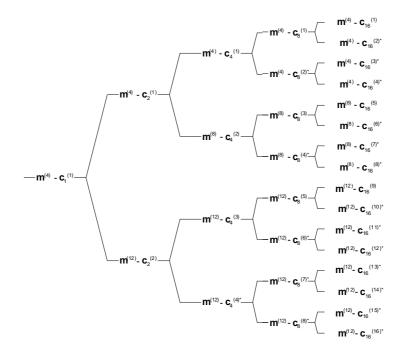


Figure AA.3.3bb: Association of Midambles to Spreading Codes for K=12 pattern 2B

AA.3.4 Association for K=10 Midambles

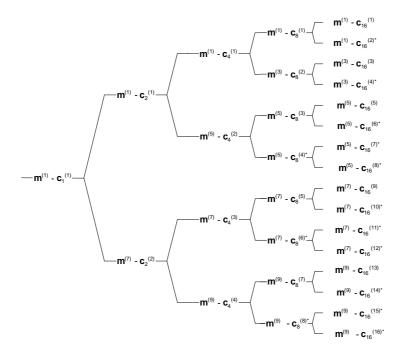


Figure AA.3.4a: Association of Midambles to Spreading Codes for K=10 pattern 1

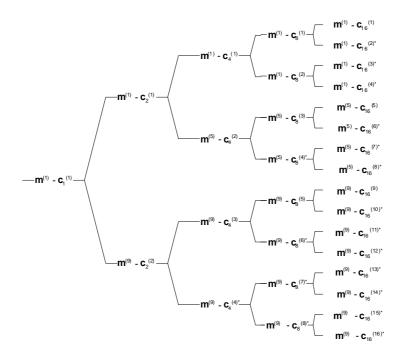


Figure AA.3.4aa: Association of Midambles to Spreading Codes for K=10 pattern 1A

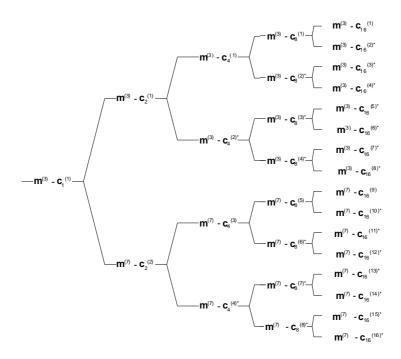


Figure AA.3.4ab: Association of Midambles to Spreading Codes for K=10 pattern 1B

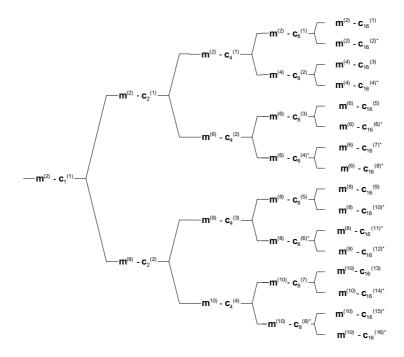


Figure AA.3.4b: Association of Midambles to Spreading Codes for K=10 pattern 2

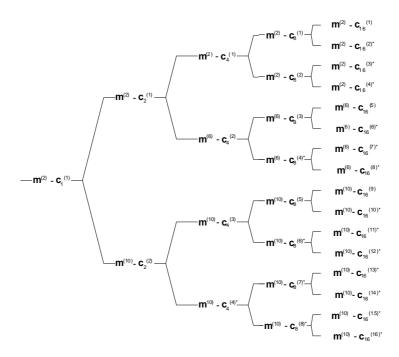


Figure AA.3.4ba: Association of Midambles to Spreading Codes for K=10 pattern 2A

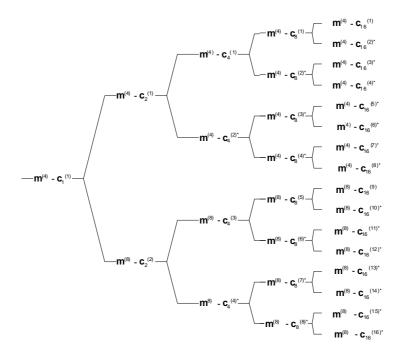


Figure AA.3.4bb: Association of Midambles to Spreading Codes for K=10 pattern 2B

AA.3.5 Association for K=8 Midambles

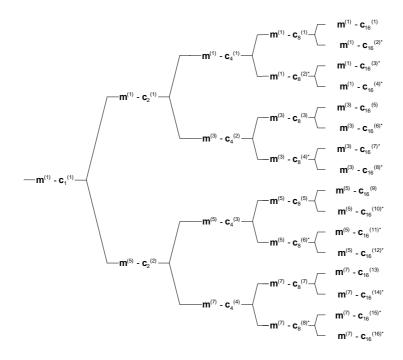


Figure AA.3.5a: Association of Midambles to Spreading Codes for K=8 pattern 1

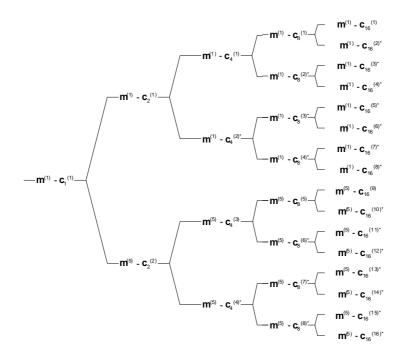


Figure AA.3.5aa: Association of Midambles to Spreading Codes for K=8 pattern 1A

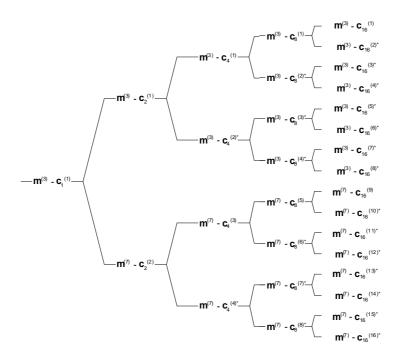


Figure AA.3.5ab: Association of Midambles to Spreading Codes for K=8 pattern 1B

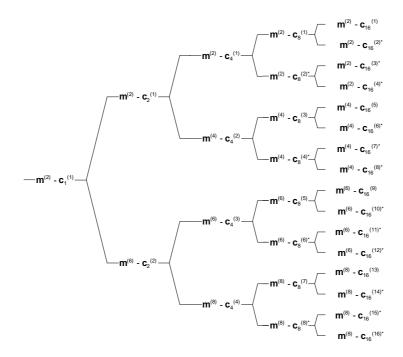


Figure AA.3.5b: Association of Midambles to Spreading Codes for K=8 pattern 2

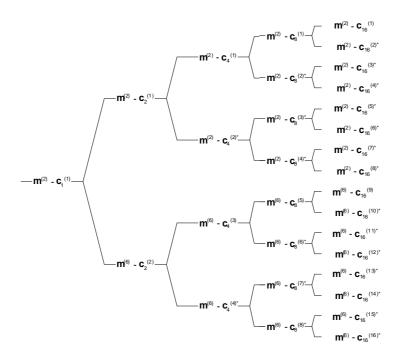


Figure AA.3.5ba: Association of Midambles to Spreading Codes for K=8 pattern 2A

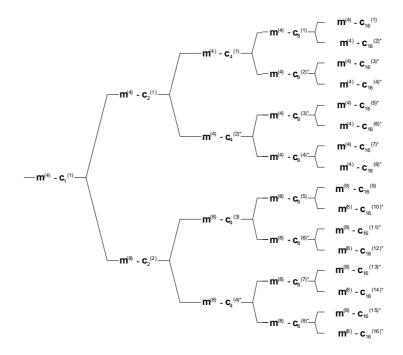


Figure AA.3.5bb: Association of Midambles to Spreading Codes for K=8 pattern 2B

AA.3.6 Association for K=6 Midambles

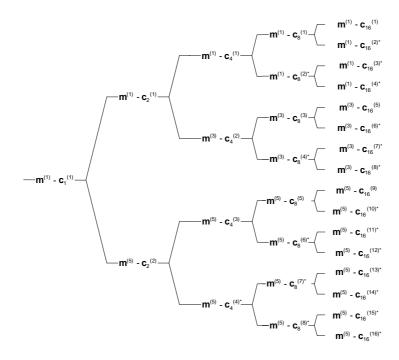


Figure AA.3.6a: Association of Midambles to Spreading Codes for K=6 pattern 1

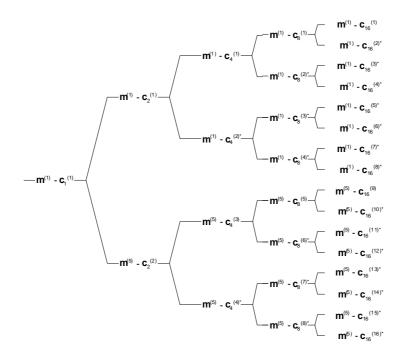


Figure AA.3.6aa: Association of Midambles to Spreading Codes for K=6 pattern 1A

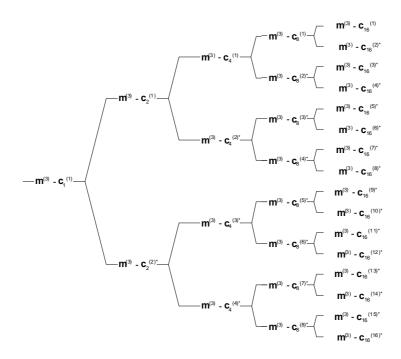


Figure AA.3.6ab: Association of Midambles to Spreading Codes for K=6 pattern 1B

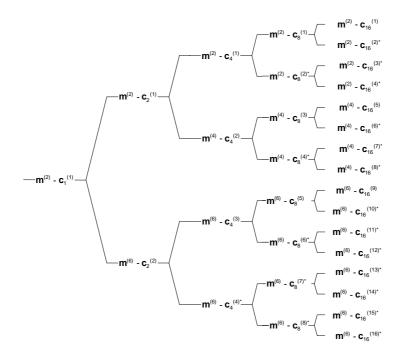


Figure AA.3.6b: Association of Midambles to Spreading Codes for K=6 pattern 2

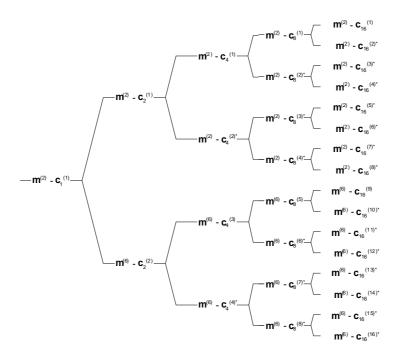


Figure AA.3.6ba: Association of Midambles to Spreading Codes for K=6 pattern 2A

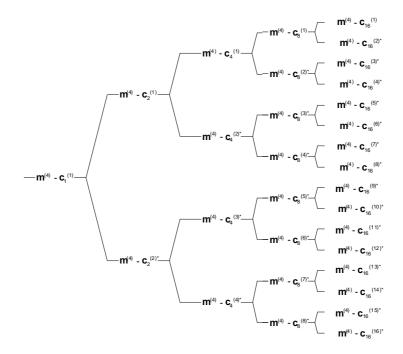


Figure AA.3.6bb: Association of Midambles to Spreading Codes for K=6 pattern 2B

AA.3.7 Association for K=4 Midambles

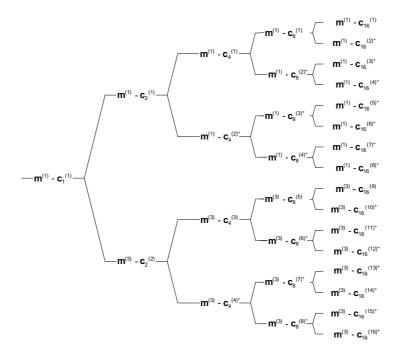


Figure AA.3.7a: Association of Midambles to Spreading Codes for K=4 pattern 1

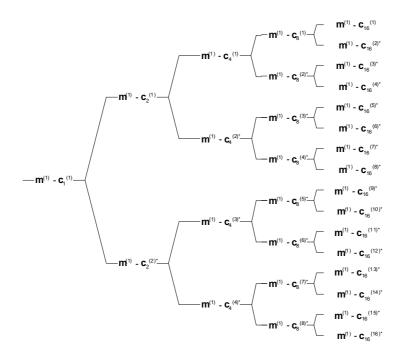


Figure AA.3.7aa: Association of Midambles to Spreading Codes for K=4 pattern 1A

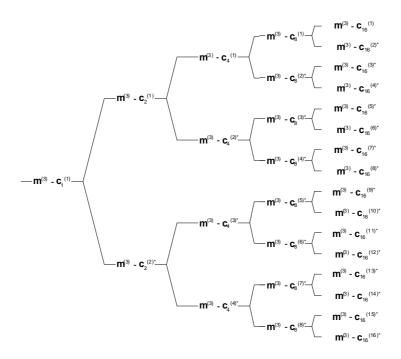


Figure AA.3.7ab: Association of Midambles to Spreading Codes for K=4 pattern 1B

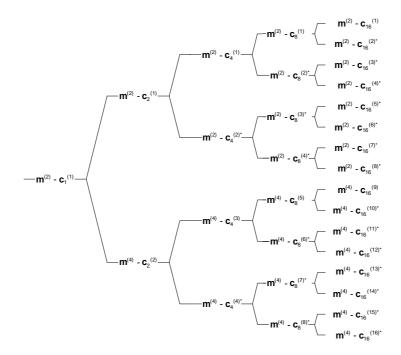


Figure AA.3.7b: Association of Midambles to Spreading Codes for K=4 pattern 2

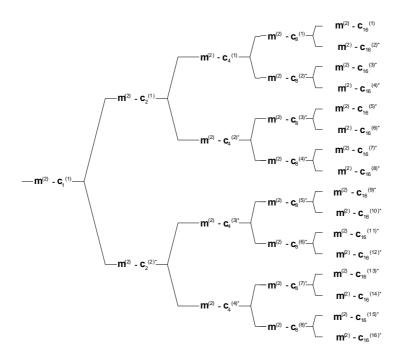


Figure AA.3.7ba: Association of Midambles to Spreading Codes for K=4 pattern 2A

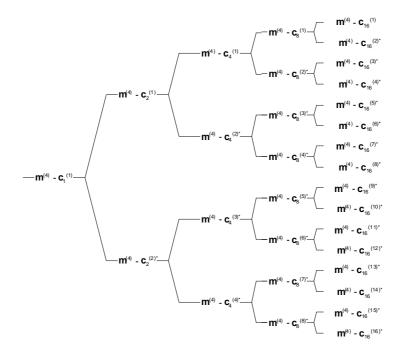


Figure AA.3.7bb: Association of Midambles to Spreading Codes for K=4 pattern 2B

AA.3.8 Association for K=2 Midambles

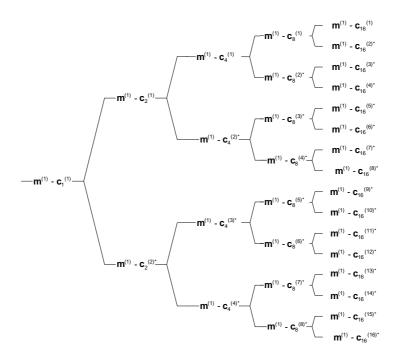


Figure AA.3.8a: Association of Midambles to Spreading Codes for K=2 pattern 1

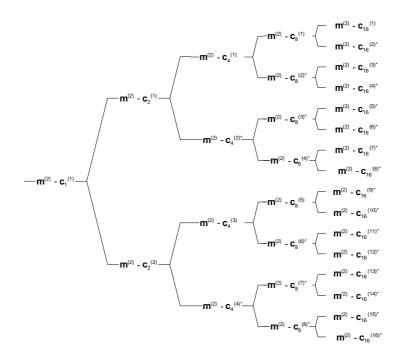


Figure AA.3.8b: Association of Midambles to Spreading Codes for K=2 pattern 2

Annex AB (normative): Basic Midamble Codes for the 7.68 Mcps option

AB.1 Basic Midamble Codes for Burst Type 1 and 3

In the case of burst type 1 or 3 (see subclause 5B.3.2) the midamble has a length of Lm=1024, which corresponds to:

Depending on the possible delay spread cells are configured to use K_{Cell} midambles which are generated from the Basic Midamble Codes of length 912 defined in table AB.1 below

- for all k=1,2,...,K; K=2K' or
- for k=1,2,...,K', only, or
- for odd $k=1,3,5,..., \le K'$, only.

In the beacon slot #k, where the P-CCPCH is located, the number of midambles K_{Cell} =8 (cf section 5B.7). In all of the other timeslots that use burst type 1 or 3, K_{Cell} is individually configured from higher layers.

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS 25.223.

Table AB.1: Basic Midamble Codes $\,m_{_{\rm P}}\,$ according to equation (5) from subclause 5B.3.3 for case of burst type 1 and 3

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
m _{P0}	9E57CC4EFF411BC3A56568FCBECB53005A3A19CA729C922826FB5E2F55D4A0C6D57335B055 188F2274154ED0F61107BD34023FDC3887072689755E733FABEED9B7967C46E9452F78E0CBE 97CAFB92DD44C90E40E3CFE9DB4054AC45EB8F260FDF8CFB5C3C23733F7344633F26CB092 AC89F4
m _{P1}	3AC41CCDCEB89F45AA67884536D0B796A5E048D76D2F9531E2E31516496B3B76196D68FB7F6 CFD8C5EA232B5C012953FFCF4C1CA7A2BDEB236426E422FD4F050C4022188D8068F47441FC 31B005F8F53452DB8D72839DF021A45D8BC51D1CF440A665D1F751145D2F04CA352BF2C0BC F589E
m _{P2}	4241DBD18BB9C42E335530533B27F0411A0588156421FA0F306C2598CD9C2D3F7D954C64E4E EC699B2414356F1D47E2A3D09A56EA850ED4319AFE7AF07538A9499206DD943AE990F43FA33 FAB6CA8E6B3615D16D17B7FF914377BC59870C269E851B4E012B107EF92542B3A2B458E10DA 709
m _{P3}	CCF886D4B65C6CEC0E3F8D8186F6CEA1FCFFEE878506F22EF69AAD6F51FDF2071B34E4ACB CD2545866C36B31C3235DD38361403E53DE6CD4FB1DC91752BF5F6C3AB442E292A90471F2A 5B9FE7599CEB4651D235D505052C22F54F868C18AB14205FD41FD468375B661BE35F0AA67E5 F33693
m _{P4}	F95E0D6F5101D3D7BBB354646818EAED147E3E4CB0249F696738B3F3A65192F5F012868C190 BCB967DEB112D907A85F33161C68B9E425A3F5EA26022F6C40ED01B8DE7FF6A6F75F313FAC 3DCD47C7EAAC32A9AE47D633CA6F47AAB8EA282B467D8CE21B1352FFCD36966F0A9B2EDE 0DF6252
m _{P5}	6FCD348CB614E6C68534737B6AB3F693A7256A85D5C28C6A77DBEA1ED62E1813E7CC88AE99 0BE4432387ED43C60FBA6556C5DBD7111B1B53FF5FBAFAF86CB761F15EE2782C7616C816A1 C77E27F197DAE6BCBD028F37E5DA7906198C98F72207A0A8FF108EAA66C84D976049E4BA42 E0C27D
m _{P6}	94503C230B52660711010625B04D9B98ABD0872DE470F3323F1D4120F46518715929FFF471421 2C26EC813F9B0601B573A3B38F8833BBCB57390D8E16A8561C54E6FEF9D8A64B2E06C07E417 B426671CDFAC9C7FA20D15B556CB39FADF128560A57D26B0C9354C1CFA5334A7C5F96B9528 1A
m _{P7}	92B52AE0D72D7559C4A277EC57995B7B8BF3CBDA1DF8FA7D6A96DD02F93B28F84C18E6F905 D87A12D923E38C4DD659819F1CECFDB48DB8EB129DD472A2718045ACDE58C35A273FECA71 365FA35130215FD801BFA471D27ECBA3A8CA946E83060465BFA9A1F3C88888133D22BF43E1C8 9F26F2
m _{P8}	BD71D9BF8F8250A64EC5131043F2B0E7424A365508E4E268A4A9857BAE4E3360058B8AF6FB4 A10B3C2BFAD8ED116229056B01F7E59E3D9D4120089EB213106B920925EB2422196AF8FA999 8389664E80DA294E1B4B7D6807FF3743EAE53276AB634EA1B080FD55425C318B1EF670E9783 EF0
M _{P9}	D61ABD7705BAB371765DE3FD732D2C5A51D5DA1BA0BF789170F01936183A55CD1693685BD1 BEC7BF691144BE24A8B74D7FCF1830425997806FE10C49E98F73BBE07835ACE5F2E6E083294 BA4048D8AD59A4E6EFE538B6D1991C21BD130D25555985D5E8AC1623FAC93663C5E1CCC77 A2B3FA
M _{P10}	652DE6FBD477D92AFC5424953C64A722EAA5D5CB0E6A04CB43273841F71525016D8DD83708 11E3F38851E973D8EC2CEF3180D1462E6530623B004813C1E154B6CF790BE4C712573ED7348 9BC2952048A5C17F51A25604A6CA660EA480618F8DA78470580CA9B987BE33F3EC6485AF440 ADC3
M _{P11}	49AADFAED5D1C27455F2FE9D2C66B31E3792F088E20562C3B6DB2E4F2C67445690164E34043 B5C98819236020C15264BAD09CD75608EE4BF2F62D3671611443D541DA129FF475E26214AFE 00419D12EDFDC443A4F7A6DD38B2BF62F64294A80937969E9920FC3A33DE7B131C61F20C195 621
m _{P12}	6D408E783793B8F8B438F512CC4AA7F94B296885D9F59505F339C5C1F7FDB8F2567866B876F1 6614BB6E3788E1B237DD8BB955341911ABADD6E7D3276F7068DCAD08737243631C42CB77CC CFF7FD7A03B52D5D4C73F8716A83B6094827098095F19F136491EB1405992E3ADB80B685FEC B2A
M _{P13}	349BA9F2D6B07CC41DDBDBB446F844D77A86E96C9C2F191F1BA42D0402754B40DFE76BAF4 DBEF3DFC28E426ACCEA6327FA51C4DAD1B6F2A9082332FA4E0BC21FCF10CA9822CDDEAEC 38760194855253E3E3D46C8565CE9EE86761B7E28BBF5C4958A3EE709B8FE9CDD0CF9560A1 DAF6CF971
M _{P14}	033E68B1E9D433BC88119CCAB47004E20B6E1B8F0E4C2756DD549EBDBC5243BC898694426A 3EDECEAAF00A7AD02D4AD1F0189A1E99B0B1D796E8BB8C5EE977280408DA0F772EA3A1AD7 44CC0C78C39070BFD324269BF86D67916D157A9BE63D9E94B76F690050368150867198BD0A6 8031CA

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
m _{P15}	C08FA672B545FA416E4856DF87BA5CBFBBD64EC62A2A294427A563F691A28EF5610A0CCA37 ABA21BD98535B4BC3F0C009CAA962384B5004063D16083C93D1A7C6002BD1D51A27B671EBB C4860092DF3B3C389A0E909E664FC4B99E5B1A39B72500335491372956E1782EDC5330CBEAB 7A636
M _{P16}	F8AB480C79497D13EF846E58F4D6A0B52CF2A71AB1236661B0D84D8CCA603B157BC07C0000 306487C41A7CFC6A3A58C1276E8BBB592F9341C298E17886E3A2AA2A08576FA2380C710422F CC0B1AB50B13D6B676EA102B6A035449A77652524F3D79B05F9EB24C286D7A8E4AFA1596788 C987
M _{P17}	53F0FFAEB51656B7DC819B749FB5DF94E4A9545B669AFA52F385C5869C4D9A2F3BB5FC874B 9DE055EAD1159C47E7BAE8F08C7F3A202D18AF084CB9DA377C3BF8F9B710F9262855E5E04F 9C92C11E4B03DCBDFDF06311DFB839969036DD115654AD90E2096862B37338272506327E3D3 9D189
m _{P18}	BA58B8BE4FB00B6122DA4EB61BFB9B775811B88EE9444BD8400CC9866193AD636A86A23588 F59E176DA8A18B856E8FFB41A8D7E91A9E874AB50B89E971AB36050058BC70C84220ED0D568 1F7CD84CD493A65B41B42E10D38B18598C63F73163EAAC1C93CF3A3CAA3BDFB29D02521777 14756
M _{P19}	0C0769A781CC98EDFB93319AC2BEB03C8475C874CA1AFF16BEDE90B07D5C6EA8ECB401916 B5688AD4C0D97DF085CB0A16CA4D678A0AC1E00F9737B4CAA93A163F827B39AFF1AFB831C EDB26EF565102DB24ECC2B6BAF72B44FF5EB88574B38ACF3EEFD87E4F6173846B151271DD1 E1466DC4
m _{P20}	132C03285553D9205AA3746EAF108D92461B3DBA03866E70A2F47360DF17502559E5AFAA2EE 6C7DC800D8F620A3294A3E2B1FFFC17AA6634D6B7F3353A652CB0825A4E13A3CE5E91F7225 181A0678F53B3D038BACAFE214FD4BB4C2D80EF35D42A2F19B69CA2162E30543BE9BD85481 85D0D
M _{P21}	C2E92D3AA8981AE97C3325B1FC1843CB0E8C5E394C201981A8DD8D1BEBF8F649166508A5A1 7819D02EB0A8EF797D8C51DADBCA9A66D949A4C7E6B37ACCE1A2E578469D1B9D8D1A47E7 BEA9DD0002FF7D64BF6519A63D9084C0841A8841E183973644DF590AD107E852F3357A70A2A 5637E22
m _{P22}	9BEF2F948ABC4CAC809972EA52EFE03907142A44F3053F970445B1EDF5D1FC9F03B6EE30F7 CD74C04B68389D5826E85E763653ED75D1469A240E406B3989EDA065BD84E34F790D74D2D17 D7ABCEC25CF7FF130C4BDA979BB5A9133CF3E79B3558E921EAF013A0CC4B87C5FDCA4AA9 F245E15
m _{P23}	6DE4817165AAC324EA17347B78FB4E1D642F74E15F292880975C42F405D440B1FB101E64DBF 0A0ABDDCDDDB388672248D2BE9431F7BD77CEF1583F04680865B315E8551A232547A807CEF C742E529CCE892EE7FB2F312E96EF7372AB4F7310F87912793FCF2BAE5DC0E6DE2CE9FB40F 53513
M _{P24}	FF5034A2747FF78F34664125AD31AB2ADD077839D8CC44372D13589649381A2198631F1454BC 450ECD0AC8D8695034CA8130B5E5DABB9EDF7A4AFC0738D82B7BAC7086FE813289092AF218 F5D04BCBCF98A07F4C2E0F8BC9C52F45C5813A693EF555A2B1EF308908FC993B2266B2AA09 C3DA
M _{P25}	FE1DBAC430C3B1815990B234583A86EB45EDCB32A38C92C3502B5611819701B1F545410092C AD7E962D3D6E232059CF0C9E8DEA6F7DA21D89F611EFE129D854C5B957FC810E0730EA0C5603B035DD9D19686BD7BD8FF0C9979C900E955A649616DA71D0FAFF079176E541F1AA27F024E669E
M _{P26}	8C0A6F60BEF5DA92E8702CEF3563B50B8C1C2D29DC82B97FDEFBE322024205726A0E5B9E6C BE0F9F02FEFB264E62FF99955B536091CEFE5C6986957149C2954E0EC43C73650855376E0A8 A4ED9873AA8AED98D10579ADFB05A8713C37851692C3B4405D9D86E6BDA0EA9A4BD0CEB7C 79E6FD
M _{P27}	205BB79C6DEFF102C2FEDA5301BC5B6D62957A3A02B486DD6BEB878558827499DFC1DC79E C55241B208599E32B99959F9589624E2C0AAF11E3C8CCCFA7EB88AE7B844B483BE360CF3441 1EF739BF073AAAF3F84E516CFA10992D606789A20F15686F54CBCE8A1305BEBF7EFE8EBA95 F723B5
m _{P28}	F32AE20D70B2FDB523682A5AE7A83307F740DFAAE0DBB58F828DF0ED20AC79C85E2FCAE3E C342E79F0EC8054231A541952736CFFED94A4F44FB7DF473C476FFB3CC87BF18A0938AC776 A26DEB32BF906D2C90F57ED192BC33F1312746B143AF383C972A2B61AD8D46F3C4E56026150 6CC87B
m _{P29}	8F6A99C81370432B4D05459359C92D87DC3D10E82454B911EAD9E80AF07F26B198C6ED71E72 F608118B67C61E8C64EA654B7BB0ED91A3DAB2B77C5CCF92AEEA8D6DB9E9AFC142F6FA9D 2E79E443DD42D0F66BFE92D9BAE58113B8811E50FF8796E13C43BB210076AE2F8FD0A1FDF3 D5B2AFE
m _{P30}	3BE3E2BD5546AFE1933CDBEA679EC8FBAB69C0ACFD5B2DF9A72CC5B4132123D6EFE9F907 CB187DB647C6C7E59F71E830DB84472B40C011CB418DACED36025BEF7289FA803D1E32FA2 D35F667D2AF8B78985D469532B5FA8336072B7FC74A515B8700CAEFCB625AC212AE335E6EB C37207FA3
m _{P31}	2642A80A8DD998C3198E6EF691B68257560C5E875A32F8C101478B24F9150883476B03F26B6A 137E117057B525F37E3749D1C1DFFC2BD059C6F4FBA8765D58493C87894E819EBC1172A62D

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
	D6F3DFF2B18A5987B0841FE85BC85575B0B1048A9138E6C9181017A501CBE76337926BD9AC778F
m _{P32}	362817D18ED89453CFAAB83B0D182FC12F3E90C124514F404743D223487FD2A2026603D3CEC 04AADB26D2DD8123B2D18C4ADFA6FA95260FC8055D29B0EC561FC355BEA5E97CA030B0187 773B726299C2CB91CD7E0EE28B89C63EBE333F316DB6209B012A230FAAA29C52D41F9DBC6B 66F7BF
M _{P33}	6E92DBCC6445EDBDAE1D566F99C4FA5AD9823981B71A883BCD14967C2358711A59B856EC48 90697E030009682A332D0F7CD85FA7E509CB2538BF395306603EE229C950D749D3A4EC4172F 8400B1E1BA5479098A79F48F3F977C400D54135F75DBC6CF97019E30954AAA550D95ED4E08F C2AE
M _{P34}	82B02C0023B142BFFF4C2EAC7E5F83D3C76A7A18EAC7B621A0F9B65152E475C8F8E2A30479 EC3EE9263F73426722E9A96DC53EC42D7C0BC50A643E66E9B8C0BDE8E893A7562CA33856D4 219A5A59F599590164B4015BB9EDCD26904B9716449FD02CA7380C6A50CE22A40E0CDB787D 109122
M _{P35}	CF2673929413ED857B0DC9894D8AE460C19CEEA9CBEDB810388C0ED13E11FB7201ED5A686 5ADA459DC8E5023C73FC13D159A7A540F64FBF586A2504C18843F42714D4699DF6591944AB4 4126A4A83D175E8C41EFB28D34048E2EBEF454150F4878F6A02A874B1BE46CCBF8577A5EBF3 77578
m _{P36}	E0FAEF096093575ADD91187D72DDB6E6401BC189A5014D6149E092146BF879450EFC3E504C3 06D0151ED465840ED503FF3BF92CE33E411A17AA7DADB365731D271791B8C21BED3557892C 4D0B3795A24EB61566C3143A54797B8BF25194A9F8CE20C5C991FA29BBA64211B4807066A45 B9E8
m _{P37}	234F19C1B17B1C403171712FDB575CB8FCBFE15B39F548E682452117597AB24B8E7E51834F22 2508ADF3260AEC2246AE84359DC0130229580F98275BD036F82BCCACBFDA34391C556EE7E4 C90A2C67252C2614175A2D0C37D5C861A0D735DA8E05D2E7712332C0BC0B33FDFED4FD90A 61D2F
M _{P38}	415B84B33D1F23316B8C7DE312EBDA1091AA5BA44319C7289C78701DD437028F8CBCA30C53 4FFF1875A230EF762F1293A9C9BFB32856DBE06EE915D1AD66417474A705B7BFF4EC8DD4488 34789AE9BBBA1D2D99080CF03841DA0242E0204D3B80680C1AA6935F3F6E9F0AA2B51E5A7A 227D0
m _{P39}	FF16F0619F5A297CC40FC2F97DA2A92A9D144C2D1C1043F53DA05909FB7F23DD82ECE70545 330C327A097FBB2F93A0E7970DC64768F76FCA0E5D255B4116550E838664791055B8D24A5837 B6DE3CA65C522A50CC25284D68C3BF61440DEA011345F3127A802234B66E5FCB893830BD39 C6E3
M _{P40}	E9EF50791AEFDCEA8D5FCE9398C3FD7A8AFBB50F2268234F62FD799FCA3BE94285C92BEE0 44A546DBC29319E983C6FDA5431BCB78AED499872F24F228FA4782FEBEB6AA13606239E56F7 D19107CFA441C2004192386AD0BB6DB381ECACE4D153DD844F9179263E899DB195F16D9581 248259
M _{P41}	C310A1E57CDA2246752056F432E5808F423AE04F5757F6B3D2E798FBCAF12517BA77CACCDF 11B18D6A04CB37D80A077C8F90FDED0D33F8739312401B6889E16B8665ACA75075210424AB7 BB2516828B2CAF89ADD0B8CD223FA9850B170D465125723D43C5DCFB7264F4247B4C0F5D32 83C15
m _{P42}	DF2A1C8FF69CFDEB8D36F67744F0C94A6028C7FFC376E4F32AE818557C2F017F040D8809614 1C90B1F4F55A22AC386BC40ED96EA1B7BFAC91AA0BF97E36F60E225E167D926536AA22BB1C E36BB9B42C53CD1A56B2354F23807B350BDCE7C9B01CE6AC7AF212C050F8E827CBC3AFF71 D50E97
m _{P43}	88F8ED04165EA0D34E412F8C7175D3C387A9B18E0316E00DB2F6BB74CB24BA74EDDA374036 FA0A4224F6434752B67462C8445EA3E51884BB5C079A862E7711AAEBE14C50DA149B032066C 88E38CD0FA85AA6213F28E5BB2D67BB1E000E16B6330BDDB9796AFA27EEBB6A0A7A1395DF FF1588
M _{P44}	5439C5FF080A258601EDAB8A0B54F51AC7C66B6D8165AEA5BE1E15AD85DFAAE4F908AC8404 DA4CAEB3FA93AD698C835F3B60205DCDE971BE63D570267B04CC26A8CF3D5051B22D9B0F4 099CA151A89508E1838185F90D7BE73161CA5CC3950E2E848B26F85B98331398AFFEFEB9A04 6A5A3E
M _{P45}	9D26B1376B5C4F5F586486CF35762FF481842D6353D6006AC191D1157CC39678F0B4D31A1668 AF65E2B78B57D7ADDB45621DAE6A3E4B0322FE0D5713485234392040C32551461A0749B5362 7F0364A998A18CC02EE708732DCA8189E523D588EF5D3CF70E87EA5140007BF84AEC5BC1BB 391
M _{P46}	89530DB4E7FEC9DB64622E6FB8F0879B24F3D023C83AD69D674189910F1EE52BED4FCCC501 EA81E122E8336A89D209FACD7F6A89F65611A470C16B12CFCB84AE475E6B82895CDA52F564 DA7726210D073B38342F6BAA22014A7D0EAFD6202DE5B03CAACA0610884223E4C787E06F84 A8CBFB
M _{P47}	A9E83B98E0C2ED7950FEB892BCAC4ECD503CBDB193D143BD03F2459DC6895A81314861930 CBD9ECFF114865CFECFBF025075D3FD471558FB7C6A6CEF8547E937CF52DA324E4EA04319 B78376D2F4BFFE8E467DD8C29DD0D44135ADF1D179886A82320FC35AABE4957641C9762F7C 3AA7D970

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
m _{P48}	E113DC0ACF1E85730EA81E964487D1D8263A186C5B627B8F96D95244284FAF1E9D8351D1DD 7957D205C15F26F3919B34196FBEDED8E88D96C00441A438D27B215AB448B6F6D9DA895FFF1 0EB3D4FEB44468F21E77CE64757F6D8A627C4A2BF0DD9D67684F80F3C1BDDADAD192EF32B AE5479
M _{P49}	687C6FAAB36FF9C20DDBCF1CBB7AE82F334E48CC6C10B988D8154DA5D18746F3E9153A551 0C2B026F5CC7B6A7562644E5936CEF2A023F40BF239A1F2A6DC75782F2D056174E8A904A7A1 1D3E301C0842F8BEAAA3D36C86F240309635A90E10E766FD8149844F8B42A9C4A59FE4863AD 0E285
m _{P50}	FFDBD37063D55715CEC274D716DB7DEDAB90ED8808952BEDA0E75599D5A29C13C483FB97D 3A0822F46F2E1F4ABB756A7FD4710DE7333B488203F7152FE1D1DECBE5AB17EDB806681DED C8CC12C11753418E2B2A5C95D60FD2DC9970DF38C84CE7864833B69046AD039D261DC1C14 CF056DC8
M _{P51}	F1748076429321CABC98153CA2C18D3ECD24CAF8B22CD97C1674F6A3EE26C016CC1B8E8C3 D0BBB98482D09ADB2B06CAAAFD73FEA2203F8A2B791ADE9C14A5DA7015A442392535CC10A 10399B2F80D818DF180707211A8D858ADD9DB1EE10BBD6F92F2DA9CC03512EAAE5BE18F7A A87573FDC
M _{P52}	81DDF8E2BBAD0D040EF4796A5EA19DFA9C0CA8067068909896A83C2E1E239D83D2B858E086 4A7BDD2962AD001EB19665E4414BE81FBA6D7BBB1787AEDB0C81913D5C86E3905B20DBA6C 9DAC555B4BA05574F3120FE8F3326B336B61BBC2068BCE2788641CD59032731BFA73E58869A 11E4B7
m _{P53}	0F59625A8BBF1E83A906E5EB9E5E1CF85DADC7BCF7736DC02DDEADC8736F7399E4CE10601 DD832D32AEA53AC895EB92DF5FFB409985EED5BC9C775C7A655102E644435ED2EB84DDF30 130F101FBF2A93FE65D473593FF3A4134A41C4C7EA6A50448F8B2FE1F91F1E9E84C95818D2C A340C59
M _{P54}	3AA62BAC2BB34A4B7D06A968E20E16A1C79D865C1F87DCA2B3DE6F3D49D962175B4D7FACE 8EB162E9E0FFF9FABD6F57305051838A7D5A370DB79F9246B3ABF10719EF9EFD86664DEC9B 06137911903AFE43D00DC992F9F8FAD1C017CBB7591E1A02BDE56B75B2F82FE61234ADCE34 AFA8017
m _{P55}	1682757D7852076B78872B235412EA5CE2AA997BD66C8689DB605F04779E70F61A4E5AB75C6 5F1BD3D9948C2442D9AF89EEAEC6609E7E1DFC95294C318AAE8FB0C2E025713BE5B38A08F8 A8463D12081EF250C482A2DD9803628B07C9076CACFFEF49EDD6A3440A6952C73493E0DEA0 DB112
m _{P56}	016B428AAA41A03CB6BAEB518F27D34CD9F4E0A7F0C149D3B8F35B9481274E4258C01E6D1F 0EF01256E48B00C7D4F9FFC242273890A4D5BF9338A1F5D74F01BF56EB2E5DE461AD46F7844 6DC2B56667E8732E73E95768CC05615752A8D2C88DF077277F026CA1A1057DA0C15D10CD609 3DAA
M _{P57}	68C2F3594AD2A41BFD7BBF60702C5581B3F75E54CE7D1B3A598400306FAA22783335DAC415A F939C4596A104724F53953BB51239BEB77D2574FDC37CA1B07C5E7AAC2774DC35DFD6B83DC CEFC3C0A9B3EACE9A6052C44E8C327B24D173A760BF9535EF8095F35D9DA3E289F636521ED 06584
M _{P58}	BC27B7917AA3ECA9ACE1F94A1A917FE1CE6754E906AD4645719CB3818FC58A48F8CBBF3293 8D18D68203507A4D2205C049AA7741E089777205F1EDA69439984BA8DFFE45C210253D528305 BFAD36FCC90683801A0F19022923E45DD0A52F6E2E3F9A49333250F76A8BA8C325A39B362D9 F2F
M _{P59}	057CA87F217E30182A60109027005CEF36F98571B1C11A6525308632CD39232853177DB25A639 192FB65EA70A70D90CCAA34FBF7C2E6233A362F46345F15CC5B2565DD7537010E1BCC22AAD D2C7BB05EB6BC05A5DF289A8AE249EAC10F21666C742A09462FE8F1D38B5860CDEFCAE2FE BDB0
m _{P60}	A2AD4999053CFAA50A1093DB07AEABCF6F80C293E00D8ECCB12B56CE7FBA3F62D686C15B3 E1A941AB480ADD6F2176C537686F770D73ED366086E67F2C46B8AC06B870880AAA2D9B44421 7504ED74C7B90390485AFC46A63F15CAD9251C638278707D46A384DB62A7BA27245A5E16D62 31908
M _{P61}	A196D99A227C44C27BF2BB0B6029557118925061AC9ECE965EA7AC380CFE1C0C33E5B7567E 4FB77B7AC7DF34E4557545366A943D375E4D8A211CF03FB7F37620E9EE47267D78ED1D0A247 8A353D2217AD5AD76892388EE7F0144ECD69CE3B5B04928CFA6A68C9FD0FE817942FF143D9 C2DD3
m _{P62}	2968ADAE21E52DC8AE811AD840AB7600A5C6FACB2F3BF707D0DE018178B5FF73BB31F5C88 E9B6C02C54B8D7B1A049E39CD7960F7109AA5EE9A18E9C3E9F0E8359952E144169870381391 E3761E3137204CA71CCC4DB38CE4394068303F088A2497FD49DF4864CBEFA1675AAA8950685 77AD0
m _{P63}	AF21B04CE4B418B9A0AD80221A9C47978750483A83E9096D9F09069C3065E8F6F1FA68EAD50 B78736311BDD70F72D97290C06888ACDEA4FBCA3B25FFBC5C8E91676C4384EC68C5D3C40C CD5AC3E75116CDC28C05F08B479A73E2AF7D380F69CEDA810A60B6FD6609CFB8A7D4E98DE 0596C4A
m _{P64}	56BC72E0F1CB9DA84FBABFF84FA635E1AF9B60BEA6C22F8953156C90691F44D2B4078EBD8E A8BF6760BCE5217E2B0C2E19D4470D3321083486339AFD6D57FF66E21C149B40FCFC5CDAC8

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
	0F7B6ED2AE576F3ECD4D14A5C56DCE7CD04147F9D725A783D9915D2E7A036FC854CC373EE 8333305
m _{P65}	EDF8D061318EC3126958D38D4E0A0C71460B5F46E16CB7FD7A4084D174F900BC8A79C672C6 12E46E2AECDFCF3C744F40510FB20D15FD9C2E696F8FCCFBF80FA6A435369889E17A612EB2 22D50A6B88BA06408DE022EBF4EA74295F5B921AE86029D376E2D51250B79053EB3AA58B4C6 F3199
m _{P66}	B86E98A32DEB7FB6F9A120725EC9C07CF1864670A9D5082D7DB7FC7656AEA8EFA05D661E63 A06D436DEA5CB02E5F29F4B3D364701B1481BCACF306804FC14EE48A19CB8095F9C456502B 39A08593AE258DBC12B358D6918C3EB8546F9F3E36646282E08142CFA309CECC823549E0294 6606A
M _{P67}	070850FC776EF3F88456CC9841604D144CDD4B58247B2938AA074009F128682E25FE0E6DF2C 3991A5029A7E4EECA22C5718D6C457F3B529702EF34C7CBE96B6EC2A2391DD6079A21941855 B5BAE1729CEDE009BFE8CBA54C25E7F0960990B004755A647D568D290A645C4C3B8E7262C3 47B5
m _{P68}	D96CD3FAF18CE3B8D470CCA2567E54544F4F9FC471F02F6441AB5F786DC9099E16C9482468 A2BF0DD84C87E36C8A7D39500538FECCF76B03086065EBF38819530458E0D4B3ADF3C66C06 6A0651D3E8A84BBF6A4697C05DE066B112A8B6118977923DC3A01F43014B02C525663748B4F6 5E79
m _{P69}	F660B66151AC70269D9405C9A987C3FF25DFB65AEA14E5EB2A699BFA335AB16974D00112062 12F3A3FEA6F0A6971FB3C6F4D73A6D44543FF1FA0775D57D13AEF2E470177C55F1D823299B1 DCFE4CA851D7E9075CE9B8D6344B47354DA209DCE4EA6C0EB1F43ED231C04DBB510C68B2 D2F336
m _{P70}	88C9890A01B550D44B635B0D4C01C20AEC17B0EA42389FFFB0D70386CC2BAD4D5A8E021A22 8BBD4059FD12854187F2F0DB1D6CF7AB654AEC2877D2B1A3A8C508CD9329A096F161B8DE72 866C2C99BB67024C9261A24AFCAFF3A483E8D71BA7AD985E9DD0CEC2A4B31E088A7CCB7C4 F39CDC8
M _{P71}	1309529E28E71D99D501350D9662F3BF5E3D54AC16408117F0083FBA22F1AAD9CC29552590B 051B725B81B56E33E36C72F8EEFDA5F3EEF4629885BF827E05A4B918B831FCFDACC9656FC4 1D30FAC255D2C931D3E090897C3E75CCA520061DE330C60AFA9545148B27A1377300B064389 7976
M _{P72}	AAB7E27B83CD46F2EF18B91FFE9D9C69BB92327B0DDE3664C8974EF7BCBC77234772C02007 B344BB99DDF344F7E5A6C3CA3F01B0F28DCD566BE913C274F296F056A74CEDD7680CA7969 A34CD785597008543208DFC63DB6C847BD364BAFE11751515287B210554A5610D7035A374E02 43E72
M _{P73}	7972CD5FFC6AF3780BB7A88BD4BF9799AC403D1976D8B4ABEAEF4888BF0C269C96572D81B3 BB55E33D30900CBEAAF1969F08E4EFC7CFE7F99DB9A184869DCB18A3D143AC725E46F01B11 EEF3940932A7AFA30E87E156428EA927872FB64CFD072106F00811359CB146C957C15C3E920 DA96B
M _{P74}	D62ABF2E9F79492FD2A22FF60CAA94DBEC39C380F12290B133DE53F18B1914DB0555BF6AAF 47539337FDFEADC58B320D67644408C4F5105F8907F2254731D319FC3CA221974D5E9006979B CA2BD89C04F2D1E1FF2D4C51F3BBF2CA5BB2FE8FD34CF05AB45599BCD6DCE5C2BC53E114 A723DC
M _{P75}	A0D97790B621153CF61E6DF09D07FABB17CD0EDFD030E300ADB777FE3569C35F747E4DD156 6196305DA32BDE5BF26E395D6836254BFF3DAC9FE2BBACC4A5900A14E2E72E0D4D05D09A7 A3BCF211D1E2F7E36CA379B52BC21D937BC628D6686F59171C5DC4A223D9AB1B8F89019FD D50683ED
m _{P76}	A133814EC7D9BA19C3BF38946484310280B2333E631F2A29137230EF8B8F9A30A958D8AEE03 A5578EA40ADC014AB6D8204C396AD7EAB3C17B1325D7D55FFE946525ADD5CBE28F3DA392D 8873C82C6CB6CB65760DB5B0D985786A7B04237C0D0C5F43C903E9CC3126AEBF3BC5CD434 9FE2602
M _{P77}	89D74B62E35F853EC718FE7A32C7B39AFCA27A41C87CA9BC76FF6640DA6ADADA997562B010 AA1841DB918E947989291BDCB50C9F40FFF623CCB0336FAAF878FD49BE092804AA73A3A419 07D5CD32A375C898373D93FCC4C9EA84A2DB9802521FD5376F9635EE1D0C3E8DC34849369A 757F5C
M _{P78}	2DDE87087BDB66B5DF7744CB16AE7164D2E5AA7B7B2CD8BB46C6A602DC9A108752DB6967F 1728B12FEEEB1FCB681DDC48ED7C1C3DA5536AD84CFD9F5E94E6148F4DD3D9CF3C830F3B 6401C8206B0ADF952AD505B96C74C615FC6F70381949B2E6E25F42D3E6563041FA5F501CAAA A93C519D
m _{P79}	ACD35DB85397D81E1124B62A60CE35E4E8214318527F96F273AB6718822971BA76448B3A6E66 2FAFF4D37BB2176934F80AFB3E03FF494AEE2F7C5B1D0B723E316AC0D67AE53A1C0637E155 729422E7F78F5FE19BB9DCF674D13157B2F8994C5DC03780B6EEC2AA0E57FB7F8A6FC0EC81 AF87
m _{P80}	43FCF00452F2E93D9A4110003601467549D08A20E4DE27F025843FAE54D9E2E5820D890558C7 541FC771CDDECEA6648984D63183ADD8E5BA52F6E56956B6F1CBCD93374F34F4709DBB812 D155528403D364CA2E54BF1F6828FB342B3D378185A6E3E8572B2F28EF6AB194C184ACF4FC4 09FC

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
m _{P81}	B130A5C2EC864C8FF71CFDC347DB4CEE38259F34A8F9CBD143763AA9DE869CA25E1A6A49D 7A6FE1DC029DB9076FB6F111351C6FDBF0D1C1DDE412B835FCF0B97ADEEE7AE09241C2FD6 20D63F894BB09E839021D4D81932BE52926A33AC9C81AB3D9586AD2E8AE53CFEDB55D43965 CA9EE422
M _{P82}	7AE9E0D3F5D0295917B116C28DC20E9B305296A3FF02339C1BBA86CD3D566D0C8948839C2D 4751730DB66179EEDF5B04404B7D867219715C87F9A18408284F0C0894E1864A55596DB9851D 0DB68B8AF7EEBAC5C01DA3284E6B42F7FCE8877AF04713C98274FB93FC8C8D421B0B572B5 DD1F0
m _{P83}	9737D9C29C179CA57976D04DF9597432A763D93B69B799EC14FFEF6F84A2F56EA0EAFD13FD 6D2C69462FFB551A58C17B06E32C59E605C34CA287EF8EA38F99C45D93A922C50B19FD02B1 30F5E704BF435A8998BE97F76181B64C56760D8A5B0043F290C1637783FBE77E9D113955431B 6F21
M _{P84}	29FE9F4CB903F8BFFB5134A5D8A2B3D7A8936A3311BB1905D9ADBA1E3467AC5D3F5F6A7758 130E4445856422CE094D85B620611E7D8F5B3C0CF386490214FB6DED5CF761BD2BC87CBB0F 4171B566FA32761C9CF11147417F50C47BD1986AFB9EC129CDA74EB0947C06B935F5A175D22 E2E35
m _{P85}	50D3795F988F865B3A9739FB23047D301913B7BDA5F87D0A3EAC478002A20C571D553EA1903 93D404E1718BDE3C780D26BC9FB48EB555A9228C323036F000CEC60AF43E23F734B104A4998 B4662D1770B46B1643EE6A9B4D8D9308F4410821FDB39403652D53952D5CDE7903BEB66FDA2 596
m _{P86}	F84F4D2894AFF4B26CF0FB72DE03D5C43D98F7A13C95FCAFA16D9AD2DEE38EBA7CE7CCD5 1F02DDEA932436451B6AF185E2C27173FC5DC4D52172E0451F4864933F7D829691994CD982D 2D7D7B302333F13CAE7DAF6EC9E67188955207AC461AC2AC124FF94ABD2705560E5DCFC6F9 8C8AF0E
m _{P87}	058C6EE106A2DCE93EF5220D1BDFDF725CBC4DB869698A72F89A886AD38A0F42ABEDC4966 FADF33AD0C39388055421F2D4D22FF5E698C4B1F002633C051582D899A9CC51973000BC3D43 E64BB0E080F392DAA65ED11D081DB55BAA3AE3EF2B5B135136E2BBBF81F17A926D9293233C 08F58A
m _{P88}	600EE81F7C9864F1B8C7337A7C1582B1A038B8461F5381276E514C27A86B1C96F61A3DFC489 0023AA73A8F8FAD7750B3A632BF745881704C91198D40F0C6DE51293656203E4545EC660659E FDE97CB52C4540AD7E6942B475BF5C8C2047E38E3F79731AB972F64B519B4DF44BF25254FB2 8A
m _{P89}	FDDF8C811955AA732713A5973F621C8A763E4057047D3CE2791D20A49250C5BCAB0FC702FA6 563274372D03275D6B3FDFB4E981D7D35A7EEA2D99F607E88CB38D7D4B35A40934EA67B3EC 9E7FE2ABFED68969E0534FC6720346D8C07CDEFC5173554F14E05BD81DCA647C355AB8379B EE206
m _{P90}	624518F8749EFD5DCF5729A3D5BF4AB67A5854398C8D6A2CCB07F2BE0D676221F764716E0A EF70515873645A9F438C1250072FA65A167AEB30CF099AFC2C2504E129D7FF2BDB28B78A36A 0D621F74FDD36D5EEC9BC4625EFEC4AF6CDCDC496B747134E6D94D87F7141481DEEB83B84 1C0E33
m _{P91}	F8DF107B028097DB928CF7A03F0157BC3B50EACC30063934EE28413D7764CDDA46D17EF91C A7205516B76933B3D50D385D871357AEFA2E34D1E3E929FCD08B940AD54762D21B73B0C144 C4C2309A26AD3EBEDBDBDCBB0B1A49AF796DC5D8F62F479A6CC739D6B391D97C39FA017E F2D85855
M _{P92}	A45FCBE0688A55D051B057C34508507010F607661BA244DB1A7CE599CB4ABC6F3575A765E41 C2EB8B5BC49E61162478CEB07461787B0EB6AD14CEAC878DC9257E48418C2F3292BD087FF3 B4CB7758B00BC5380427E620776FFF7128254CAEF743129B317B8C21D0ED02B3B94785048B3 B274
m _{P93}	432250D31BCDC883439F92FFA76470DE1B6689465A0FBD3A12AB4D165012AB32B7EDEBC859 68CB1BA84C24321CDDCAADB0175DC6C2FE2EBA78EB788E049F8ED34A3AF1F42519957C748 96872C3BC6C0A7A210E8438EC84085A3C4E3884E8B79AA57F85937D815C493C044B80519F76 EAC075
M _{P94}	4E3834426643F2C419007C48053C6B7AEA54D231D68631D5CE305FC33C155405B2566ADF0BC 3E4D70B498B3CB2981425D610559C2EB63213F07AAF3E240653230436ABF9D823799A05D78D 4D5A45A67F6637C9D9A4BEF410BC0290BCFB47E206A64FB6EADA1CCFC9B77023EC705670A 9439C
m _{P95}	B655DDE80717690057C86FB8C2F94A922D4965624E527B42C080EDC3114472B5D58E3076EE6 06A6513515FF6FE1F5C6CC4F6A34AD865C7EAFA03558BDDA4A96A838B1D13543B87E382A4C EC3383E4F2EC960D9707CC52624905326B32B0F6C8F3CB3FE7D912B8040518E61C0C1D0BE6 135F4
m _{P96}	D3817A6FD2936F4738A55F19CFBD1EE3801CB86F9B9656D39BB4CCE5EC930CB801BA371A05 876F63F2A9919BF8E769F140338176169439309841D43FC304EED8D80164D2EFABDE83DBBAE A927748597DC553E6A2EC52E3D7340FFBEAF817484A7558B59753BD8661596C940CA6F16570 D6F3
M _{P97}	0CCD1503DBC6DB746E369372930B18BEC1C972C30D3BAC9547590AA432AA5280492851CF89 35F74A5431E97169A3322586719FD703B122B70A0394D784A010D6B9BCA2A9C7284B8368127F

Code ID	Basic Midamble Codes m _P of length <i>P</i> =912
	2C00BB31CFC8EC1B3A31EF6EE148114BC0867C1182A742FA26A2EF1F62F948762C3FC6DF7E 1E4C
m _{P98}	68AD9382C2FB0471F415D72240613B24F019FD981423501796E76898F2D423801EA8321E01CF EB9DCE4AADE7CBDF0C10F94F98E6C9A561204D4051487E5326173030FBE760C28D8BE6815F CE78805E9C55CF7994AC8482B6A13254CE7FD3ACCD6D96CC35913962F57965D2BA905D50F4 F7F4
M _{P99}	965AD6AFCF7A822E2D0A7F3F8B23BDDB9DA7667882789C85A010B0CD095E2BD43919DD6BC 8F290FD5FB7B1F0A4F8C47C348EEC37F483B75721352856568DFCFC16AA1168E1D948E9861A 5E693AA0AC4F26225CC888DF6F326DF4D5014C892ED9A6A8E99C4140BAF7C03873532F0CB1 EDB7EF
m _{P100}	11514B31D4E01ABB0202CD8B26B4F3610886058BA519EF4C9701EDF8ED2E935F65AFC454C0 B672B14B06672BB742640EA5BDBDA47FA5F87BE583F65331E2A30CD850B4619637DD7B84646 06F10236714131E1D2AB4EC55654D05A93050E6F8748B4DC83C6202B7FD63CA1FC0EA00DBD 48538
M _{P101}	F6FE8BDAEBB7FAA334EC95ADC619F8A04171707C84C79A7C96F973392176EB7AC5626FB24D 0F88EE8D5FC99DA5F03C381A93ED455B13DAAA4DA3EF7A092D114316F6D25F319473BFA8EF 025438B0A510DB7F4E8436A38B16606150D2B35B2872DC206AFB17732FD16219BA58CBA1CE4 02B9A
m _{P102}	912FF3C82D2B7FDA4703DAE6E349E1844212B4672DB02A4D0D4465220C1A4CF0E7D56C945A DA538D465A76C7DC3AE272BCBBAA4FB9D9925EC41FAE0735380C1126E36EBEE55270F99A0 D851FEB280B103E3F51080B99496B2E3027F6EC16D91EF42C58E4089AAE68CE075D323C4A2 D409CE0
m _{P103}	4789D7468124CE0AB731772154704A07BDD14C319DAA60E9E3B55E30D61616301AC560BB31B 6341FA629F630204D057A74B8226EDE4A4696159DF3BC7DC3597072A1A95464142AF23103CB7 C28AA69A7D2CB990967427F9EADF3EB65FB95DD72CEA804DEEE0924307794D99FF406F0AC4 0F6
M _{P104}	9A5C8700EF68ECFC28CD6552C267515F58593EA84FD48BB5D63EA028DA77F92787FECA4FED AAC04591502198A10725B62AA7361C932B58C6F4D431103A56AF5A8400E8DE5AD26788F28526 387908EE52B030B639DEBA260A321B09BD60E7BF3C54E1D8264A04B0F65D81F9473622CC05C
m _{P105}	9F6A2D1D54D09A6A3AF7BF514DC754301A164602D531807186D9930FCFAF112D40F72D17DC E9C40E9EEE8FD2E5D1D3BA4543ED609DAF163CED9BD0074D3E5F7E17F5AC7B4FC4CA0690 977DA3533AFDBA5BD328BA079BF2335364035D68673B98330B92AF5E3C26A9AB596986EFE96 65219F8
M _{P106}	FFEDAA9F3DC1F267C121D6303743286B1AB1094A1790B58B1E4DDA9D16303A3289BC4440987775D6491383589C96181AE093289D42230FD88BA098F3575FC393246726C9EAFC6955EF135EF07E862915734A5994D2CA7301FE844DE7B4BA9417CF10045BEF5F4D4C5BC044A347E5C9E99821
M _{P107}	644CA39E3F93C4AC795EFCD5B8BD90228E2638BAE24CF4C3DE75697823DF4AEDD3253E980 81C4BD215DC64A9E6BC0115027F6BA4E4FE2A93FC726DBA4D9D21DACDBC76B45377B68863 F9FD426E4F89625657EF97C03D277C373E15D21EB721AFEAD246ADF1A0A2A0CEA730BCA98 CDD4CB808
M _{P108}	AF16DD60C5458A3D27E36850281E401B10116D5B0BCEA1B159C97487584652047981333D5573 686F4C0A063E1186306FD02DEFE2C61722C5BBED60249AA2D9260ACDF870B3B5F5CFD75815 80DE486D8D9F332A6C6B6464AB0E9D54159CCCD03D6F9CA12C13DE34145B34FA40703FDC7 6AEE7
M _{P109}	33FC7C9D9FF74A2FF009240C3AF398937D078012219BA54C6B0B0D9448391CD1D4017CBDB5 4AA59355EF05A9712779D71761D96F650EE10546C39694938AEE89F7CE6FCCF4BF987D0E9DD 584992F2732D5838A92E537559EDE2FCEE82302D7FD8B1C9CF8215B67BE61D4EF4523EF9032 B1E2
M _{P110}	DDAC8DB73BF5A8FD9A74561DE805959C2ADC755274740993616B3771D10C6F5B0B8E4939A4 44F280B39CFD29EA0F562FEE0405451D8D9DAEFB8B1E0C8D69CBEDD6D23D8A56A3A9B87B D6EDE46FBCCC135D70B8FD4619C35F9A72E93E8954FA787B8452347E4B209013736D0EC059 A243803B
M _{P111}	516913696CB4D961C939529F64585F08C42D1FD1DCDC78F16DFD5BCE287434ED251FA1AABF 676006D75FC455DDE30C8840BE6AEAD10F8A12C641800C35B8CECC9BB54037AB1075190EE3 D2D8D81F675898FC442A57B3A7B18B0AF90528DA8019245182E920B926AE569D656E3BB03A9 75CD9
m _{P112}	B2419222199441C48BB085E7982DCFC0FAEB16D39DBFD22270AB8EA6A802DF3580ED6A68A9 0E3AF03281B48ED3FAA2DC45371E3733539E70B137ED82D5A2CCC2031BE3D6A4786EE9D9A9 153658EA0B483EDD49F9D1E189F3D418B73825CAF3B4D05A805F80FCCC5949704252390DD3 E86EF6
M _{P113}	04D96F94A767AB70BE85D6EBFF3831E2825595CAF1583CAF2B75010816DF65757F4BB4BC58E 011FC5CC50F220EC72ABF672E8C9A29821D4A106603187276492C366618C68CECF60AA6D4B4 F03505EE0BEB591336E130EF4593C5C11749CC3D2974B1AACD0DF19672F9330457241E201DB 7CC

Code ID	Basic Midamble Codes m _P of length P=912
M _{P114}	12CE52D22E8BDFC665F49D86AC6C488C9012088FA091E5EE13B7C45A9A5CB156F147D6ACB FF87C4817350AD15C5FC3773F3C58FD0D3B88242CC46DD43A5288933ABE5A6055FD67B1159 3C900A9654D82BE40200E38C7A9643BF25419861A2D674B84995301121FB34389CC5AC83E94 CCC738
M _{P115}	3831B0AED8C54E6F5F348C22351E35AB1099C47149117A40521B30D005DB13A81337A7EF75B 0A6FDEE2012E394935C2D61C0BAED3B65D4FC768C30F654E97BD33A54F49A2753915CAA137 F8B99861872F00F6C019DA1A27277E1FD648608CC108EFA2D85490980F7570C37619D5F4785E A45
m _{P116}	2D7BDCD4C93F3175F441994A9B188976A7F4F714A80AF693139FBB757C1D0D71274167EEF2C 36F891612ABF8B3504FB2A1F0BC1DF24186A6C2B79A4EF118F67FF477AFD650F6BD208599D3 31C3B5ECFBD173C25D7CBB9A0C9D4E0F455509A8BEFD805201429E3192D82477E4E85D606C 53AC
m _{P117}	01E085F900F58E7769F8C8A24DCA26984EE56F2D8CF0A0726508094A20ACAEF0703351EBF8E DDC1C59012F9A3032B11D5BB260FAD321280BE48642CE84C0D3681E57784332A87DA3C06C2 CCF0993A6EC2BE1A979414EFADEEF3CEC8E12C41F55DE52D48F0B851EA968C159B9CB2D51 4CF4C5
M _{P118}	32814E789480CDAF8D0E09BF65DC4863B99B8542F0693D77ADAF6F32D0173110789E26F1BB8 F9A8A71D09DAB03FD52935945D7A4EC68C8B043B27AA81200CCA1DA23A9833217CFCAB5D6 2E0C488EA2DA2C73DB031F205D7F960E9D8918A5C652C1501EE93204D273464BEF438A94DF 4496AE
m _{P119}	15DD44EF0204B908795A090C32188643FBE7366EBF30DADCFB2C41953A854FEE39EAA7E9E4 E58E30B45409B72AD05B43BAE11095FB1D20FB2A73E04448DEC973926BD7BA0EC291A29AA7 EBDA5783A2A253649F036962A0E4525A07C66653394116352439A2520891F8E18D2CD360FFE0 B111
m _{P120}	89217691E99FDDE0598092D7413C6946390C718299455B5B455CFDE3E2E15CAE056389BE60C 836B500053044568990C9EE40582F6978F91EE5ABD501408EFD805F4F64FCE2FAA5607976AC0 16633E12FED435EDC627548B79898DE3B5FA8B246196CB2F4289A0E3FBC7A4A911274D4CCC 980
m _{P121}	B3047C6EC9C960702C122202B7BA48D54A1015C1F9CA22D879FF5435C6EF930FC5EF8FD811 3B48BE47D794B87E5194F8E7B4525B4CEE45FF5D0D70CCC00C67496943EBDC878DE4F9BC8 849A24CFB05282B117F140A4B1967B8F4E38A0637A4E8C916914CFAC15D399174B1AA65C86D A472EA
m _{P122}	CED19A2B452FB08A4E677AE137AD75601BD7824CE59E4FA627A3C5AD101920FFD89328B3A9 17782F05781BA0292EEB18193BC1C3C02B48D272D449F381CA20B12B1C27A480C628A33AC47 2F2EBEEB775D3D3681A365C728DB9476CBF8744D84448FC6303BDD28BC38413277F6B61CCD 4A913
M _{P123}	EA7FD3D0732484865089964AFD0181F0A64E0B9BF58C20C3F34D45739C01ECDD11681E3B4D 175D237A19C2800C8024FB7D3A14DDDA53180B10E8F1C569DD9CE06FF19EC958989AE43ED2 6E96DCA2E954BCBB6EB502F0C269EA75F5CF002BF49B383A00159C0D39AC71D502B5571636 16B66E
m _{P124}	D08DC6EE2CB2EB2D3890230CF7411F51F71024C8F05CDA7F958CBCB81B12C0CF27342431C CD1BBF61DEF50298E87ECB4A98C489D3CABDB55CE95EEAFF850BA13C0F772CD9F2943F961 227078A05FA3AEE18E61657D04AA37B7F98BF5B6DDEF0F87ACAA5B4D1D2CE0622DF6B8816 EFAA2F448
M _{P125}	70C1FC8BAE04C07CD256269A02056B79CD0014D188197B4BE89AF8A460026EA8FBC7C13A77 93F2822A94A4A7234727516D44A5BA521E3E28C34396C69BEC8233FD0D82FA8D5B2C4F12F92 84962A6F19C2E655AC44BA85F064E8D134F28F9EC479FDBFBA74223466D185CA34C7188C6E7 E515
m _{P126}	82323B03B81937932EF44D0BB2A22DF5F8803080618940A4F1DED2778230FBE3D04545B86B1A AC4AFD43A90DA09148456DD81684F7C143C48C710076ED7A60BD6128BB9C4717DB97331CFB 667E9EC1D4B03191B3A218B12CC957A3F5182A452694FDE1A4241B1410DD104BE1551F1E85F 8A5
M _{P127}	BE616513AE32C4143C92A7CECDB56F082F7907098FF61403161D95CA3767AAF7F46A8D60D66 C6195D27F25FC5D0D840F7DDDD67A3E492FD9FB85A805CA0438F822BDE583BC11B74C760E D2FBC9DAC6F361EDF71B17B96B065D5E2E43A9A87A7CD561FC8F4BC809F474D68E6C4B6A7 542065A

AB.2 Basic Midamble Codes for Burst Type 2

In the case of burst type 2 (see subclause 5B.3.2) the midamble has a length of Lm=512, which corresponds to:

K'=8; W=57; P=456.

Depending on the possible delay spread cells are configured to use K_{Cell} midambles which are generated from the Basic Midamble Codes of length P defined in Annex A.1.

- for k=1,2,...,K', only, or
- for odd $k=1,3,5,..., \le K'$, only.

AB.2A Basic Midamble Codes for Burst Type 4

In the case of burst type 4 (see subclause 5B.3.2.3A) the midamble has a length of Lm=640, which corresponds to:

K=K'=1; W=256; P=384.

Thus for burst type 4, K_{Cell} shall have a value of 1 and the midamble is generated from the Basic Midamble Codes (see table AB.2).

The mapping of these Basic Midamble Codes to Cell Parameters is shown in TS 25.223.

Table AB.2: Basic Midamble Codes $\,m_{_{\rm P}}\,$ according to equation (5) from subclause 5B.3.3 for the case of burst type 4

Code ID	Basic Midamble Codes m _P of length P=384
m _{P0}	A88E403803494ACD25F9E40A2DCDD572F13461ABE91E3931AE9BAA94CB6250B33216EC49AE 028C3BBC10389C97F8652F
m _{P1}	CC81718FE2E076D4CF6787847831AAD28E7B131136D8F6BA65B6F32240918434A3F445405562 FB1449F10E152DAF8E57
m _{P2}	F40249685685DC493F2F7B8FA91E3373C9CC902C0BD54963EB4661355AE6F0CAA345E3043FD 5943520360E136708D755
m _{P3}	7699416BBFC40E597656AB7B319EBEA4B6B898BA357DC20BF01A36A2FCBBC1191012836E53 2F0F16EDF1B1CEF8C8B8CF
m _{P4}	FAEFD4A1EAB45332B43D34DD877032192973A4D6F3DF1394E26FCB2FE608A777FBACAFB87B 8598AFEC0387456274D828
m _{P5}	D7E24FEBBDEE2558FD4B77BE0F9C79D86192A829A93A8B8B4D93322B1ED2C5D8408D9F64E 75390B7FA9E471EE94503C8
m _{P6}	419C96CBF5D07CF7E8CA5F0F768F635EDB2AC91013955685FC464F533BC0A7258D1F820E79F B4E3D64AAC88DCDBB3089
m _{P7}	E3A9C7C56BD042B22E63B7A593F95A82FF67F59F50DF76D419022A69C986F86F98C0D3981B3 297BA8844BB0E9CFD7C81
m _{P8}	6D15CF45BA384523320B323033CAD89B6738F7AB22D252DC51AE9EE06F290819C6BE3F7F9A0 7DE5BB70E57E8F878BDE4
m _{P9}	D8EEF2FB18D658B7C0BB3A1186FCCB4F5EFC5768F6989946D7858A678EE850D90BBF2520B9 2A7131143B9F7EB9F92E8A
m _{P10}	13C613CF8AB1ADBB998FA7E415710C87FB2C4C64B040E153FD2A8FD05DB395B4BC4BBF561 1855AD3F354DB99F1A7364C
m _{P11}	64B93D117F33C1FB4BDCF82823C977CD7F749512ED50B51D9399EEDEADF57C39B1EEFD182 3272C26121F74967803ADD4
m _{P12}	E9757EF85FFC178DD991A01C81AE8A36E47B1450E6DA60C96967E798E47B43C3BABE4AE7FE F186B305E6AEDDC8D0A4A2
m _{P13}	D83562B863CAECEB41458179A04E4D90DA7B6F15C627A81480ACF210A3403E7E60506E85966 5EB6AE94BB2079988DBCF
m _{P14}	54D018301703F6E38A1DB4496DB91650AA4715A51D4D1807401CEC4AFEB6368B9AD50A15FB B7238935963FB0987671C8
m _{P15}	20176660D98A8C4D0442BDF1F0EE3FB4D1684B7A93684FA4395B784D1CA8838A238F28AFE90 03C4D3EC0562C5E79DEA6
m _{P16}	C5771FEDE124CE07C75F48321D8B0EEF34275CFFDD49F7D59685CCA298D09D36A558C903E2 EE5C74A20EB02E50FFBF9A
M _{P17}	7B2AD0AA898419CE863FA812CF47B32F369C9A404A936648F0DBBFBF521E822635E7A87B17C 138E2357E957737F4D67F
m _{P18}	0005E4C456A52687FB8C38217E39A6CBCD18EC8AC6951F7482CC19BACE70BA1E6E116AA6A 5780F656C72B49EAFCD0312
m _{P19}	F7561674AA43738CC1EFE9434061CF17B8FC55792BFFBEEA2B61F5E1A46BB14B19926DC98B D4B747166044BC0F652693
m _{P20}	C1F98B595BFB89F7F40B1D84965981E7035455112C337DA389E04D8146B6F40D83352895247E 53142A8D7BF7063A0E88
m _{P21}	2374B1EB35DE57B4114DA547D25C39887663800D53E7C0A4A8A97525E7E364FA011B23A113A 4C1067763DA770E58CAEC
m _{P22}	D3E5382DF383595C983C2CC2369703A5867C84AB2EBD9C72044EDD8CD5683BDF4CDF10ED0 4D4DEB1D3D459020247A206
m _{P23}	7344E4A74618745A817E7036FF6535629AF647E852129F6F70887CEAA8393DC859725FC7BD52 CDF241B31FA7BEDF9BD4
m _{P24}	E1EAA999935A9C04CE360B3077241EF63FE1103A3C15AFB1CFB7AEEFB93CCD5357B0068E70
m _{P25}	F28EDA990B6906AAFFA4D2 39BF69ED889CD875DA83108FEF691ACD1FFAD5B5E76218318EB45DEAB2022D82455B592C1F
m _{P26}	C550FE197165A07E346D5D B817C216E9A0A224D8E5A4DF3F68D53BBB89B156261C5FD877FA96352A073B6B0E53BCF076
m _{P27}	5093DB7AF0C6E13AD98BE8 075DCFDE008B110F56C59A61219770846DAA58B896D4914047EF786F03E13F985B03BBE4FB3
m _{P28}	B352A19548163C5144B69 913AFDAD21CDAB1D363C8FFEE158E9EB5EB699D54DE5E65770A963D349744BC935C4ED0C4
m _{P29}	9903CFA0F13EEFEE3BDD511 B6C348E72A210714B90035C905F22D6777849F28C0922E3356DF84F655896C2E8E8DAD0C1AA

Code ID	
	BD7CC81633CEA68E8AC47
m _{P30}	51813E8CB9F2259B52C62FA1955034D0BD52B39C108EC46D3AFF6F8F8C3BDD1ACB3725345C E83C0AD7DCDBEC4547FC96
M _{P31}	CD1DDE061856436714BEDDE2EE9DE7A9A2D795125FBE023A13AE1DE727EAF0B6265AAD72B A3BF4C40C82996F486A50EE
m _{P32}	1690CBF556A6D9268773D5840033E9DF832FFBE2BD0F09D93DFC18E92340EF9CFD11BB6331 D7D572D7D17CECAC6D2D23
m _{P33}	244048BA6D32A3793E12532E670BAA42EE28BF58116F67B9EDD184E1861476D928447A874A1
m _{P34}	EB0A6A43F1760EB19B83C 81FE8B4F56FC4BCB5E1366CF41E6C559FC109846FFF538636862AA52A5F12E1F974B656D381
m _{P35}	1C882A30D56CF2775E473 921F5B3F5FC92ECE95B09141BAFC214696D1E534E711856E327FD1D8823D4854C510E6C381B
m _{P36}	ABC0B29C600B193F9130A 50A3DF0CC1B0A1BB8573F7F973106FBC94504D86DFDA067C119072D8745FA8D6A263D07DAD
m _{P37}	DA3723ADB439BDE5DB539E C3C0412A03C79A6A77AE17DFD4C56963BB56550C3745C9A5DF8E68855CCB60290CDC0F314E
m _{P38}	260AFF330194A62CD4DB44 66B2C238B87005022F58273AFA04E2C590C6D710ADE4549E735E99E17D1170A1244AED82D51
m _{P39}	465FF3FB6416C179C246C CC0D235E5D80947EB754EFC63F6EECA6F0B9D9197C24C7A14CD72CAAB26A8F5386A231B77
	A3AE0D204369C57DF0D8E6B 6CBC1D14CFB4B14362940B67BFFE9B3C333F1DD8A97D9F947292EC91A3D01BE0FCED3529F
M _{P40}	78AFA2A2F74213B87218E6C
M _{P41}	C3119C5FF33FC2CB957EBB2E9B993A85BD70BB99E3A6CDA07E4343ED282293A5F4E7F9C9E D356B322C38259FE10EEFD4
m _{P42}	B684A2F64D90CAB23140481057AED62E36315FD5759ED05747E4A149E784C78C52FC09EF812 32BD1C1647C95CE10CCC3
m _{P43}	A70B5E173176C74A6CD11BA10D026B8C86BB44814CD7C27C0A03137CAB8725AF6CE05F7A6E 2BA9BCFB1072A8152843A6
M _{P44}	9257486C5A5AEA7B21B9D736FA20C34C22AA3FBC1EC9B66CAB8F8625DE7F4522DDFD8D7A5 22F6AC31AD7B03463310C1E
m _{P45}	1FAEF03FD59EC8BF1FA57595018F1F7EF9F4517CD0F1AC5B82FED8877AD34E7333F06C3D5B CB3592B2B1084036664A51
m _{P46}	F838C88284898DDA2EBE40972DA884AFE7912367CBCF5453894E639EA54A053653E888038530 BC516737C43786A5F2C0
m _{P47}	1171FDFE14B8A432BAA6401868CEA05A02572C83FFA26E16444B0AD21C67B3F190D9C3A61C 3F123523266BD232BC4BB5
m _{P48}	6055579BEFD3E751073BE2EF913BE962643CA37C14A172E607C7A8A8C57B521D34B121ACF6 AFE419DC7E4DE665239251
M _{P49}	5D9DA3875FF37C084F7917873538EB73E66B62B74B82EF127855AAF990DF7D2D06FEFB33168
m _{P50}	1846B928BDE429E01551C 24A63008BB9355A32892C8BB5F50D6B1B0007563BB7E2526DF1C9D4C2439630E9EA3E8FC6FF
m _{P51}	A34E297324EF00AD1D063 2E64310629FBDD2F27B3487A7882789B23B833273D1E7AF4E7DF99E26555DA45AAA7BAD244F
m _{P52}	A71B00B6155C0CA50EFE9 E47949C3577D92C3635CB7A96E8D63A778815DB1324053579BA12560B46E7EF7B935183E3DE
m _{P53}	0A79FE88FF857B90DF2A8 D11CD2FCD449E3504A3CB8A92650B9376A927F882231507D9FC7A851AF31AD0977E1DBD594
m _{P54}	52532C0E841E82501CF8B1 D9173DEB459627122EB6F6E27B11FFFF944AD65E9F2729FD0F340486AA4F2E58CA7647C25DE
	C30FF55530922C46314F9 70ED8ABA76E26BC7C9E8748930944691EC16B7F702042733306D10824DA33E8A2EF190FA80E
m _{P55}	D616212F2926A8457C7DC
M _{P56}	D7CB3386C837EF00E8E56C07A3620AA239E182929956B9423B364E3117D2E6165EDE6FAF13A 009C4304AF6F3A5154ECA
M _{P57}	E1671C07DDCF6CF5DF9A9E0CD9E6FE5C56E21CBF48028EEF2DC57993E44A46C1D32B0DAF DA39695EEB5D8AE603315355
m _{P58}	036B1806C6F2E9C263C0470BCDE197D43C8B9A2046A26B8FDAAC49FFA1E6096A7E87229574 A67B7BB7FBBEB9754A7EDB
M _{P59}	BE3B978749D105923F6B5D8FB00F96D7C9B6C50989513D7197FE2C5DF74BEF6B328B9E884C6BF848A9C57D0C42613CE5
m _{P60}	54195927E67F3D1A28EA929625B6FD934EBF60662A37D64B2BCCFD8A3C806E5EDEBE9BCFC 37F7EEA5026E071C2F10CEB
m _{P61}	088C7E3F08322F71C5234A2DC35A19E385FE21BEE0CC9C2E6DF7E9F4BE424B86A583F64A9C

Code ID	Basic Midamble Codes m _P of length <i>P</i> =384
	EABA6FE76E0A9D9DAC9545
m _{P62}	2BD321E1A7ABFAAC6CF26EE71D2EC4373C05FA907BFDD3C929446FCE9714F98A89A0F41260 E658C8BDEEA291EDF5ED3F
m _{P63}	0CACCF6119FFB876DC319D3F95AB34899FEA7DA7C264A8B897087F5D58776F4978D9F4A8DF 40E0858655C82E7974F3C0
m _{P64}	370B1A0FA2DA6E5F8B79D567C59404BB5DCF7584C3193BD37CBF1CFE465FC28EF6F15634E4 6B7620CC3AFE5482ADCD40
m _{P65}	C4EF59CE4C46245B85E50AAEBDA987F51614860DBF05A0BF66706D08B2CBEF9306A9A3A811 7682CD40A02C394DA8563B
m _{P66}	3C77FF11EA6861254F844E393C6D8856939780A8A1F86148AE88E8C09320627CE6176936FF96 ED6642AE7E33A82C5599
m _{P67}	A5AD10EFCF9DE41D6436B38590FFF5C582B9AA60ED65FE5596DE566CED7E8E41C11156B541 8926875F06DBA319CCDA1A
m _{P68}	82B543431DDF83D2647C3778A41BCAD41295CDDD0A496D133E2F5F4577582F7D377AB993CF 18516298EADFB3BE01AE7B
m _{P69}	027F6793D64483CF5569FEF03190B2190CD0A210AAED5C13D8A726433660F8095A6A46715276 050C77B2FBA0DCF5A3C5
m _{P70}	B37EECA1A844DA19736EF3C5FDC6E3571BC7E04FB0A1E2522D1A39E21A0BF2D1D066BB9C0 B99F6CA0D3A82FB7561272E
M _{P71}	AB07BD3A4F83028263156FF5E307FD5D253689D76A8AE789691F339258EE9BD1EED8DF3C3E 625E325B28A96A467FA181
M _{P72}	2A7DA74C4C39B7BEE0CFC2C9F22E00910EC527B3515F486A767FD63B4C72C24F87EEAA337E 3357B868D6B88C6A19FE2D
m _{P73}	21008CAA6C91705013C5753F1400B994BB1F197327B09D0E7DC7DA0A6436DEB19835E26A949 051EF75DAE4BF7864250F
m _{P74}	3CB53B21CF1908B000B5675EA9FDC8DD3501FD7C5CB77A3C48C6EDA3F4D6133E9EC68374E 708978B296CCD708C75DFDA
m _{P75}	6F9CF0F9C735DAEEE85F6EEB096A163D18DFB7D165F2A9BBECBE152C8CEEBFA32CEA5816
m _{P76}	A4966469DDC92CC095728360 597EC8A534D095769B15D0337343CCDCA78E696E9C7F18E7BE1C4C474FCFFCBA2E4EB257C
M _{P77}	04012BD7094ABAC47842FB5 333D73827842A2203FEB548072C28C290492A2B355EDD78C1B65E0ED270680E67B98929EE5C 89743A78FC342CCD00AFE
m _{P78}	5BF3C14AB0643D1DBAE821BACFFD1A47A6FE901F2338162624331AFC25A2A66E38EA958114 398D13E4FB4699A4051AC2
m _{P79}	C99275C3D2108C1C9BAFD62AD68C51DC57ACBBE8B263A18868F4A1A89823C914FE19C85B4 163B4B10177A2B0513FBC2C
m _{P80}	4C66765966E60CB0B1D25566FFD085EBE34571B31C820D42F30A53BA4BB2C3C220DB0B717C 7D3961DED7902B25FFF67D
m _{P81}	1602E7FB6ADDE8FE385D43E33322D734D8E7B920CFAD9F71ACAD855C71A57B8B40CEC5ACA 32E073B642E070B6BA6A2AC
m _{P82}	5B43BD325ECE4E2DFAE4DB8C861F5A7445897406EBCC625E075184D18440B395DC4EDABBC 20E29518A41F7F1652003A9
m _{P83}	3FF81A8A1493C202BB1062C49D88395F74DAF53A69BA63896571383099CA5F8B915E0670867C 61EC8A794FAAC0A44A17
m _{P84}	FF8DBBA2E6C93F02CA775F8510E975E825AF2F43D3818746BB4BF930D54E84EF5E34B447CC 375DE50CF61436C62DDDCD
m _{P85}	40D95EFAD7A7D2B1E00839BD4892ADB5CD1F93B8BAF7CFE528BAB563AF711CE5A6A4C1C90 19FC705FE07A8364B9BC866
m _{P86}	531F4E313FB8FAF0B40B70B65DD7414C4CD9028D34CE27730690B5BF05FA3C7E5F0FDE11AE A05A450BB358433FFABAF3
m _{P87}	A2FF0392249EB69A3EE41A07D50AAB42B1786988D5C3569D31238B86320529825A03432995CC F599561A6E728C1077FE
m _{P88}	6FDB10A9B40B83D1D5335E99DFDCA540CB0AF54157145634F60AD3690EDED4688BFFBB1C36 F38D95ECAFFC363D1C32DC
m _{P89}	92E6BBCDAD4D50572520D0FA4D6957A844180CE6B56814CDAC0D01FCD45973860CCF95D04 38D2E99740EB6247F362BBF
m _{P90}	64F199A6673EEBEE362837001ED5CB04C787CA34B5812D1EB9ACDFC26BD8CF7D6837A3E17 5776E47EA7BA8A185BAEE02
M _{P91}	677B0CDD0AA2362F9FE396A86105F98DF40DA2F6F9056BEC59D4F58FDF9F8B3C96CB756912 29298B087CECCE960FF58A
m _{P92}	DEF9FAEEDEFE2419FA4B449D1B89B5682E2737893D73861E8896751C98EDB97FE420C49B47 BD5C613C6FA4975D45C9E1
m _{P93}	1726AFC63875C59FE90AAC65B025B474391B5260DC7CE6BB922B02ECBFA91C53B9110C02AA

Code ID	Basic Midamble Codes m _P of length <i>P</i> =384
	5251ACF6E8C1360B26A00E
M _{P94}	35312E77E51F7B5DE09F130BB39C8EAF2CEB52F25D1E212FF6ED76A1FF24B777C40887143C8 A62794595D0B1D0BF2CD8
M _{P95}	5D24F5A606D43E707271201EFA13E6895BA4F2902A20A40D58E238E601644ADA7CD86D9E99C 5656ABF1202B6CC8E43B1
m _{P96}	F80DF53DF2589FF24B7B328D55FC7F0D48FB86C29C29621C6A430B08AAFB7D5AA85198373A 77F7B12892E881C3926E7A
m _{P97}	D052486802107E23E728599BB13AF620978666D0D7754F5865C0D22E9360DA73D581D8C4438E BC5C2C3D56C74222297D
m _{P98}	C31DC3517E333297B221A9F7CE515A937E73E7CA83267C2E9F5EBEAE1B2560FE08ACEDF23F 36BC3ADE463F2D54D20846
M _{P99}	88A39E4C76F47734449643EEDA50D53FF03257408630A124DF37A3E1CEE6CE99774A8D4F4BB C051610E8678D178102C1
m _{P100}	F97DF22FC49643368615CF1AE6D533DF665526FF687D6700FDABAE8508387A0F3C8CC570095 33C6CB4E6BE4745BD79D9
m _{P101}	CA8B772CF3F8D8DDA7F6F150055AC969C3DD65E9877C874BF8FF647059C4F72A73571B46913 EC206CAC682EDDCB01563
m _{P102}	211E6E505E3B7C4BDC9DFAF1EB0457627847593C0557E1426A1DA992CDF40CCADA7C9FA6D ECDF1D3CCB9C23DFCFCA6B1
m _{P103}	548D9792FE5C5707FB28B1277DB9735FA78847F0DA1D6C153EC719BBDD5187C496F72579E6 C74405859C218A03B9FEA3
m _{P104}	49FCBC2408159269EE42A32A5F0F44D1D30DC91756E274E573DF961E7B05DA1C532AF3036B B31BFE77AEBC37051FC96A
m _{P105}	09C767858FB0AA0BCFBA1FE6BBEBEC75765BDA2456959A84FE9161E2E5F4260666D3FEBA71 924E26447BAD5B92E58E79
m _{P106}	622AF5FCD674D2C2D87205243E19B1C65726D78513C8FB88945A5F38D1C6400411753F63402F 6280CF702ECD6852E4BD
m _{P107}	B53353D78D382A74373C16B36888D56575DD25E5701E7F8C8619DB360B422632E7002905B16B 1B6D9BD5023B815C2C6C
m _{P108}	E183A082E8344992730B23036E315AED6E156FA27045DF86B067A99FB68D2DFA3201205457D3 BD31A88F0BD88BF8C32D
m _{P109}	9AB97BB759FDDE364A61F5158E6938AE346A03F6D073D0C4ED838015ECF56477D736A487650 670FDD6D0AB1245EB60FC
m _{P110}	08C36A4F926400AF9A17D43CAF2613A9D639549C94EED7CD6FF00E60D985DAFC394AB8BA4 CCC9EBFC7939D5C3AB27FEA
m _{P111}	9881A3B723E688515287243A605FA52838AE13E94BFBF4D97D6E04530C2EE43906F7F81019E8 6AE4B32504A92F399AA1
M _{P112}	2807EC91A1E3CC4847A758D16EAFE7E3AB0DB5180A978BFF7450F06778DA79CAA15E467B1B CCBF6992DEC69AE88D89D3
m _{P113}	9E9A5527723F3A4F339E828920D2556D21CD5E6FDC89B6575AF9FFA38233BBC05E8F2AE7052 AC7DBF622BF369A76F0E2
M _{P114}	71812CEECEAC08C71C633D4C815AD805555A6ED7A778FD5F4D4810E5D92DA662B6836015E8 F9303A79798493E4166CC0
m _{P115}	4147CB2F5C019034CADC1EBB6331B3DE37197611A6635B0784B4BF0DBBF12AEEAEA3D2E794 B9C1B6BB97FCC9D408DAAF
m _{P116}	445499D892AE276B0C2CE2BD81924E91B6A8D072EA3E63503F2287EB5F5E639EDE88082C164 18FC294E08D069F4CC127
M _{P117}	66EE0C821076D702D1D5C35D37F25F0DCE3C8692B9CB65C4CEA5579F5AC3EF25CB06691B7 6DE6D972AF370A27F1415EC
m _{P118}	D60A097019B8C9171A344854DDDCF6472F39DE9B9447956F78B60763A80EF6CF93B650E7B0A 81D59DD4B0FCBCD25FB0E
m _{P119}	7244FEEA50F90D284132D7DFE7E93C0EF16DA1A10765118691471255518CB76C44AE6B274C0 D3BC5C143B06AEE07615B
m _{P120}	8D6B45351ABE278271368F0E2DA5EE5BD014746202478243DAC30EB011326BF99845BDAAF74 3D54214C193A2DF54F991
m _{P121}	42B80322CDB54071258B9B6911523E063CFC88AF918ACBBADDFE89EB7C261003E32931C3FC BA525A48553A533458E872
m _{P122}	3E1A4867271132EB25B853FEB3B44F80F69D57BF796D71F53C46D598E5BD2D22F8347B64559 1FAC08AFCFDFE5C838317
m _{P123}	91AB7E8D6CB2EBCB099F275B1BA0C7D8D18E8A6FA2EFF169100AE4FF0ECB94F79FDDDA7F5 AD42EAC766741C96E608D6F
m _{P124}	E16CC4455F92D7F7AAC7D83A63E94A286AE4B9CFDBC3181FFB94CC26CFDB43DCA63A169A 20BE959E65062A5524DCCB86
m _{P125}	9E1BEC0CB9835F5FAFEB3C4A27D32A982346ADC4215F5A7237C4D1009CB2DECB9C1C486DD

Code ID	Basic Midamble Codes m _P of length <i>P</i> =384
	ACDADEAE123F958666B0EE7
m _{P126}	CB04C57E4069E0CF9D4AD9D71567C2D243A9FB0DEDEECBA8D77EBF02CCFA77B4C491915B 039FE851A4B8D9197D577A16
M _{P127}	7CB3DEC05A1E73C703BF610AC8914E2F4D63329FEFB69E1B35E86F92AB87EB27EEBC098B5 B1119CC8BD1B149B2A01946

AB.3 Association between Midambles and Channelisation Codes

The following mapping schemes apply for the association between midambles and channelisation codes if no midamble is allocated by higher layers. These mapping schemes apply for all burst types 1,2 and 3. Secondary channelisation codes are marked with a *. These associations apply both for UL and DL.

AB.3.1 Association for $K_{Cell} = 16$ Midambles

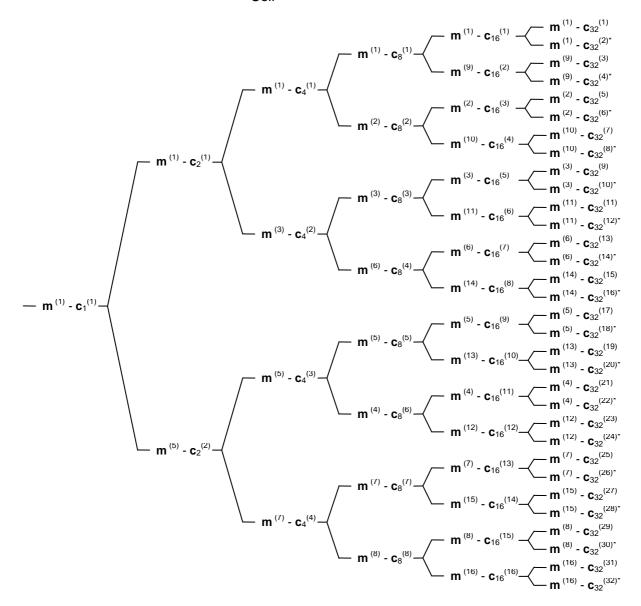


Figure AB.1: Association of Midambles to Spreading Codes for K_{Cell} = 16

AB.3.2 Association for $K_{Cell} = 8$ Midambles

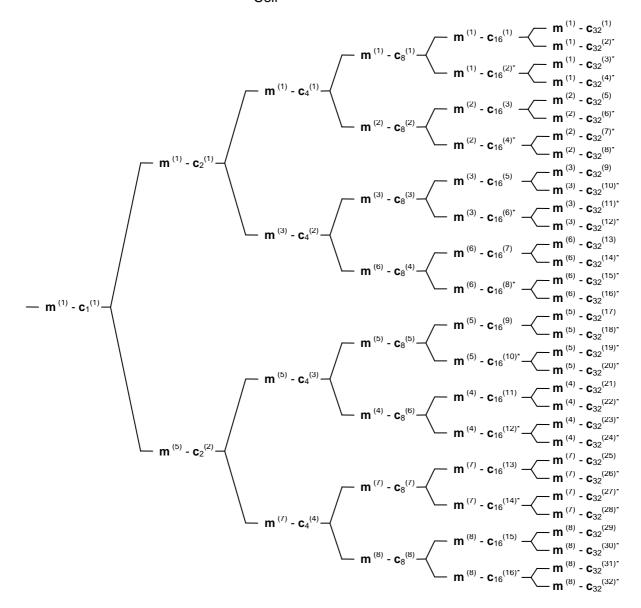


Figure AB.2: Association of Midambles to Spreading Codes for $K_{Cell} = 8$

AB.3.3 Association for $K_{Cell} = 4$ Midambles

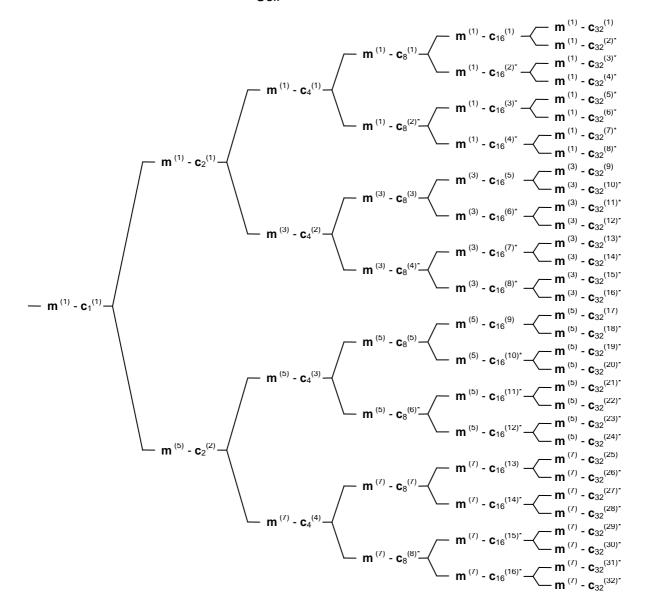


Figure AB.3: Association of Midambles to Spreading Codes for K_{Cell} = 4

AB.3.4 Association for Burst Types 4 and K_{Cell} =1 Midamble

For burst type 4 there is only a single midamble defined, thus all channelisation codes are associated with the same midamble.

Annex B (normative):

Signalling of the number of channelisation codes for the DL common midamble case for 3.84Mcps TDD

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused. Mapping schemes B.4, B.5 and B.6 are not applicable to beacon timeslots where a P-CCPCH is present, because the default midamble allocation scheme is applied to these timeslots. Note that in mapping schemes B.4, B.5 and B.6, the fixed and pre-allocated channelisation code for the beacon channel is included into the number of indicated channelisation codes.

B.1 Mapping scheme for Burst Type 1 and K_{Cell} = 16 Midambles

m1	m2	m3	m4	m5	m6	m7	M8	m9	m10	m11	m12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	14 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	15 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16 codes

B.2 Mapping scheme for Burst Type 1 and $K_{Cell} = 8$

Midambles

M1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 code or 9 codes
0	1	0	0	0	0	0	0	2 codes or 10 codes
0	0	1	0	0	0	0	0	3 codes or 11 codes
0	0	0	1	0	0	0	0	4 codes or 12 codes
0	0	0	0	1	0	0	0	5 codes or 13 codes
0	0	0	0	0	1	0	0	6 codes or 14 codes
0	0	0	0	0	0	1	0	7 codes or 15 codes
0	0	0	0	0	0	0	1	8 codes or 16 codes

B.3 Mapping scheme for Burst Type 1 and K_{Cell} =4 Midambles

m1	m3	m5	m7	
1	0	0	0	1 or 5 or 9 or 13 codes
0	1	0	0	2 or 6 or 10 or 14 codes
0	0	1	0	3 or 7 or 11 or 15 codes
0	0	0	1	4 or 8 or 12 or 16 codes

B.4 Mapping scheme for beacon timeslots and K_{Cell} =16 Midambles

m1	m2	m3	M4	m5	m6	m7	M8	m9	m10	m11	M12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code (see note 1)
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes (SCTD
																applied to beacon in
																this time slot, see
	(*)															note 2)
1	X ^(^)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13 codes
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2 codes (SCTD not
																applied to beacon in
																this time slot) or 14
	/*\															codes
1	X ^(*)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3 codes or 15 codes
1	X ^(*)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4 codes or 16 codes
1	X ^(*)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5 codes
1	X ^(^)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6 codes
1	X ^(^)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7 codes
1	x ^(*)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	8 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	9 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10 codes
1	X ^(^)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	11 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12 codes

(*) For the case of SCTD applied to beacon, midamble shift 2 is used by the diversity antenna.

Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble(s) shall be used.

Note 2: If SCTD is applied to the beacon and only two codes are present in a beacon time slot, the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midambles shall be used.

B.5 Mapping scheme for beacon timeslots and K_{Cell} =8 Midambles

m1	m2	m3	m4	m5	m6	m7	M8	
1	0	0	0	0	0	0	0	1 code (see note 1)
1	1	0	0	0	0	0	0	2 codes (SCTD applied to beacon in this time slot, see note 2)
1	X ^(*)	1	0	0	0	0	0	7 or 13 codes
1	0	0	1	0	0	0	0	2 (SCTD not applied to beacon in this time slot) or 8 or 14 codes
1	X ^(*)	0	0	1	0	0	0	3 or 9 or 15 codes
1	X ^(*)	0	0	0	1	0	0	4 or 10 or 16 codes
1	X ^(*)	0	0	0	0	1	0	5 codes or 11 codes
1	x ^(*)	0	0	0	0	0	1	6 codes or 12 codes

^(*) For the case of SCTD applied to beacon, midamble shift 2 is used by the diversity antenna.

- Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble(s) shall be used.
- Note 2: If SCTD is applied to beacon and only two codes are present in a beacon time slot, the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midambles shall be used.

B.6 Mapping scheme for beacon timeslots and K_{Cell} =4 Midambles

m1	m3	m5	m7	
1	0	0	0	1code (see note 1)
1	1	0	0	4 or 7 or 10 or 13 or 16 codes
1	0	1	0	2 or 5 or 8 or 11 or 14 codes
1	0	0	1	3 or 6 or 9 or 12 or 15 codes

Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble shall be used.

B.7 Mapping scheme for Burst Type 2 and K_{Cell} =6 Midambles

m1	m2	m3	m4	m5	m6	
1	0	0	0	0	0	1 or 7 or 13 codes
0	1	0	0	0	0	2 or 8 or 14 codes
0	0	1	0	0	0	3 or 9 or 15 codes
0	0	0	1	0	0	4 or 10 or 16 codes
0	0	0	0	1	0	5 or 11 codes
0	0	0	0	0	1	6 or 12 codes

B.8 Mapping scheme for Burst Type 2 and K_{Cell} =3 Midambles

m1	m2	m3	
1	0	0	1 or 4 or 7 or 10 or 13 or 16 codes
0	1	0	2 or 5 or 8 or 11 or 14 codes
0	0	1	3 or 6 or 9 or 12 or 15 codes

B.9 Mapping scheme for Burst Type 4 and K_{Cell} =1 Midamble

m1	
1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
	15 or 16 codes

Annex BA (normative):

Signalling of the number of channelisation codes for the DL common midamble case for 1.28Mcps TDD

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused.

BA.1 Mapping scheme for K=16 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	M13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	14 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	15 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16 codes

BA.2 Mapping scheme for K=14 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	M13	m14	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1 or 15 code(s)
0	1	0	0	0	0	0	0	0	0	0	0	0	0	2 or 16 codes
0	0	1	0	0	0	0	0	0	0	0	0	0	0	3 codes
0	0	0	1	0	0	0	0	0	0	0	0	0	0	4 codes
0	0	0	0	1	0	0	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	1	0	0	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	1	0	0	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	0	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	1	0	0	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	1	0	0	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	1	0	0	12 codes
0	0	0	0	0	0	0	0	0	0	0	0	1	0	13 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	1	14 codes

BA.3 Mapping scheme for K=12 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	m11	m12	
1	0	0	0	0	0	0	0	0	0	0	0	1 or 13 code(s)
0	1	0	0	0	0	0	0	0	0	0	0	2 or 14 codes
0	0	1	0	0	0	0	0	0	0	0	0	3 or 15 codes
0	0	0	1	0	0	0	0	0	0	0	0	4 or 16 codes
0	0	0	0	1	0	0	0	0	0	0	0	5 codes
0	0	0	0	0	1	0	0	0	0	0	0	6 codes
0	0	0	0	0	0	1	0	0	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	0	0	9 codes
0	0	0	0	0	0	0	0	0	1	0	0	10 codes
0	0	0	0	0	0	0	0	0	0	1	0	11 codes
0	0	0	0	0	0	0	0	0	0	0	1	12 codes

BA.4 Mapping scheme for K=10 Midambles

m1	m2	m3	m4	m5	m6	M7	M8	m9	m10	
1	0	0	0	0	0	0	0	0	0	1 or 11 code(s)
0	1	0	0	0	0	0	0	0	0	2 or 12 codes
0	0	1	0	0	0	0	0	0	0	3 or 13codes
0	0	0	1	0	0	0	0	0	0	4 or 14 codes
0	0	0	0	1	0	0	0	0	0	5 or 15 codes
0	0	0	0	0	1	0	0	0	0	6 or 16 codes
0	0	0	0	0	0	1	0	0	0	7 codes
0	0	0	0	0	0	0	1	0	0	8 codes
0	0	0	0	0	0	0	0	1	0	9 codes
0	0	0	0	0	0	0	0	0	1	10 codes

BA.5 Mapping scheme for K=8 Midambles

m1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 or 9 code(s)
0	1	0	0	0	0	0	0	2 or 10 codes
0	0	1	0	0	0	0	0	3 or 11 codes
0	0	0	1	0	0	0	0	4 or 12 codes
0	0	0	0	1	0	0	0	5 or 13 codes
0	0	0	0	0	1	0	0	6 or 14 codes
0	0	0	0	0	0	1	0	7 or 15 codes
0	0	0	0	0	0	0	1	8 or 16 codes

BA.6 Mapping scheme for K=6 Midambles

m1	m2	m3	m4	m5	m6	
1	0	0	0	0	0	1 or 7 or 13 code(s)
0	1	0	0	0	0	2 or 8 or 14 codes
0	0	1	0	0	0	3 or 9 or 15 codes
0	0	0	1	0	0	4 or 10 or 16 codes
0	0	0	0	1	0	5 or 11 codes
0	0	0	0	0	1	6 or 12 codes

BA.7 Mapping scheme for K=4 Midambles

m1	m2	m3	m4	
1	0	0	0	1 or 5 or 9 or 13 code(s)
0	1	0	0	2 or 6 or 10 or 14 codes
0	0	1	0	3 or 7 or 11 or 15 codes
0	0	0	1	4 or 8 or 12 or 16 codes

BA.8 Mapping scheme for K=2 Midambles

m1	m2	
1	0	1 or 3 or 5 or 7 or 9 or 11 or 13 or 15 code(s)
0	1	2 or 4 or 6 or 8 or 10 or 12 or 14 or 16 codes

Annex BB (normative): Signalling of the number of channelisation codes for the DL common midamble case for 7.68Mcps TDD

The following mapping schemes shall apply for the association between the number of channelisation codes employed in a timeslot and the use of a particular midamble shift in the DL common midamble case. In the following tables the presence of a particular midamble shift is indicated by '1'. Midamble shifts marked with '0' are left unused. Mapping schemes in section BB.4, BB.5 and BB.6 are not applicable to beacon timeslots where a P-CCPCH is present, because the default midamble allocation scheme is applied to these timeslots. Note that in the mapping schemes of sections BB.4, BB.5 and BB.6, the fixed and pre-allocated channelisation code for the beacon channel is included into the number of indicated channelisation codes.

BB.1 Mapping scheme for K_{Cell} = 16 Midambles

m1	m2	m3	m4	m5	m6	m7	M8	m9	m10	m11	m12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 or 17 code
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 or 18 codes
0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3 or 19 codes
0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4 or 20 codes
0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	5 or 21 codes
0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	6 or 22 codes
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	7 or 23 codes
0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	8 or 24 codes
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9 or 25 codes
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	10 or 26 codes
0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	11 or 27 codes
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	12 or 28 codes
0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	13 or 29 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	14 or 30 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	15 or 31 codes
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	16 or 32 codes

BB.2 Mapping scheme for K_{Cell} =8 Midambles

M1	m2	m3	m4	m5	m6	m7	m8	
1	0	0	0	0	0	0	0	1 or 9 or 17 or 25 codes
0	1	0	0	0	0	0	0	2 or 10 or 18 or 26 codes
0	0	1	0	0	0	0	0	3 or 11 or 19 or 27 codes
0	0	0	1	0	0	0	0	4 or 12 or 20 or 28 codes
0	0	0	0	1	0	0	0	5 or 13 or 21 or 29 codes
0	0	0	0	0	1	0	0	6 or 14 or 22 or 30 codes
0	0	0	0	0	0	1	0	7 or 15 or 23 or 31 codes
0	0	0	0	0	0	0	1	8 or 16 or 24 or 32 codes

BB.3 Mapping scheme for K_{Cell} =4 Midambles

m1	m3	m5	m7	
1	0	0	0	1 or 5 or 9 or 13 or 17 or 21 or 25 or 29 codes
0	1	0	0	2 or 6 or 10 or 14 or 18 or 22 or 26 or 30 codes
0	0	1	0	3 or 7 or 11 or 15 or 19 or 23 or 27 or 31 codes
0	0	0	1	4 or 8 or 12 or 16 or 20 or 24 or 28 or 32 codes

BB.4 Mapping scheme for beacon timeslots and K_{Cell} =16 Midambles

m1	m2	m3	M4	m5	m6	m7	M8	m9	m10	m11	M12	m13	m14	m15	m16	
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1 code (see note 1)
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2 codes (SCTD applied to
																beacon in this time slot, see
																note 2)
1	X ^(*)	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13 or 25 codes
1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2 codes (SCTD not applied
																to beacon in this time slot)
																or 14 or 26 codes
1	X ^(^)	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3 or 15 or 27 codes
1	X ^(^)	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4 or 16 or 28 codes
1	X ^(*)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	5 or 17 or 29 codes
1	X ^(*)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	6 or 18 or 30 codes
1	X ^(*)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	7 or 19 or 31 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	1	0	0	0	0	8 or 20 or 32 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	9 or 21 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	10 or 22 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	0	0	1	0	11 or 23 codes
1	X ^(*)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12 or 24 codes

 $^{^{(*)}}$ For the case of SCTD applied to beacon, midamble shift 2 is used by the diversity antenna.

Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble(s) shall be used.

Note 2: If SCTD is applied to the beacon and only two codes are present in a beacon time slot, the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midambles shall be used.

BB.5 Mapping scheme for beacon timeslots and K_{Cell} =8 Midambles

m1	m2	m3	m4	m5	m6	m7	M8	
1	0	0	0	0	0	0	0	1 code (see note 1)
1	1	0	0	0	0	0	0	2 codes (SCTD applied to beacon in this
								time slot, see note 2)
1	X ^(*)	1	0	0	0	0	0	7 or 13 or 19 or 25 or 31 codes
1	0	0	1	0	0	0	0	2 (SCTD not applied to beacon in this time
								slot) or 8 or 14 or 20 or 26 or 32 codes
1	X ^(*)	0	0	1	0	0	0	3 or 9 or 15 or 21 or 27 codes
1	X ^(*)	0	0	0	1	0	0	4 or 10 or 16 or 22 or 28 codes
1	X ^(*)	0	0	0	0	1	0	5 or 11 or 17 or 23 or 29 codes
1	X ^(*)	0	0	0	0	0	1	6 or 12 or 18 or 24 or 30 codes

^(*) For the case of SCTD applied to beacon, midamble shift 2 is used by the diversity antenna.

- Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble(s) shall be used.
- Note 2: If SCTD is applied to beacon and only two codes are present in a beacon time slot, the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midambles shall be used.

BB.6 Mapping scheme for beacon timeslots and K_{Cell} =4 Midambles

m1	m3	m5	m7	
1	0	0	0	1code (see note 1)
1	1	0	0	4 or 7 or 10 or 13 or 16 or 19 or 22 or 25 or 28 or 31 codes
1	0	1	0	2 or 5 or 8 or 11 or 14 or 17 or 20 or 23 or 26 or 29 or 32 codes
1	0	0	1	3 or 6 or 9 or 12 or 15 or 18 or 21 or 24 or 27 or 30 codes

Note 1: If only one code is present in a beacon time slot, this code is a beacon channel and the beacon channel is the only channel in this slot, by default. Therefore, only the beacon midamble shall be used.

BB.7 Mapping scheme for Burst Type 4 and K_{Cell} =1 Midamble

m1	
1	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14,
	15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 or 32 codes

Annex C (informative): CCPCH Multiframe Structure for the 3.84 Mcps option

In the following figures C.1 to C.3 some examples for Multiframe Structures on Primary and Secondary CCPCH are given. The figures show the placement of Common Transport Channels on the Common Control Physical Channels. Additional S-CCPCH capacity can be allocated on other codes and timeslots of course, e.g. FACH capacity is related to overall cell capacity and can be configured according to the actual needs. Channel capacities in the annex are derived using bursts with long midambles (Burst format 1). Every TrCH-box in the figures is assumed to be valid for two frames (see row 'Frame #'), i.e. the transport channels in CCPCHs have an interleaving time of 20msec.

The actual CCPCH Multiframe Scheme used in the cell is described and broadcast on BCH. Thus the system information structure has its roots in this particular transport channel and allocations of other Common Channels can be handled this way, i.e. by pointing from BCH.

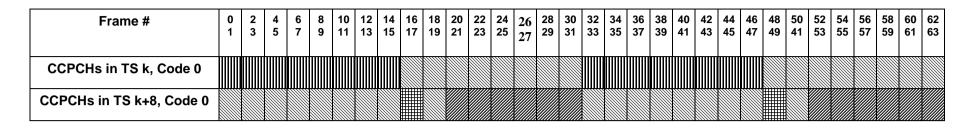
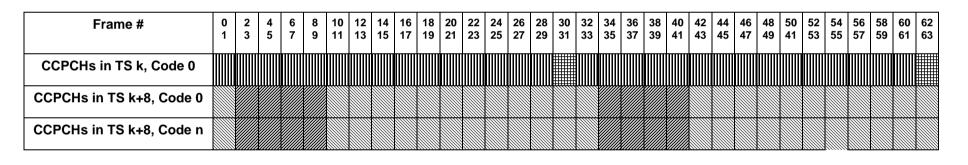




Figure C.1: Example for a multiframe structure for CCPCHs and PICH that is repeated every 64th frame



	BCH 22,88 kbps	FACH 36,6 kbps	PCH 12,2 kbps	PICH 1,53 kbps
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Figure C.2: Example for a multiframe structure for CCPCHs and PICH that is repeated every 64th frame, n=1...7

Annex CA (informative): CCPCH Multiframe Structure for the 1.28 Mcps option

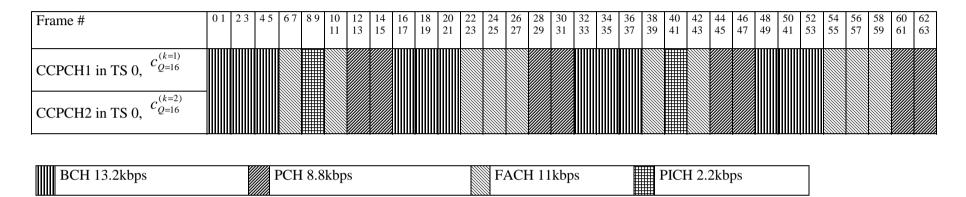
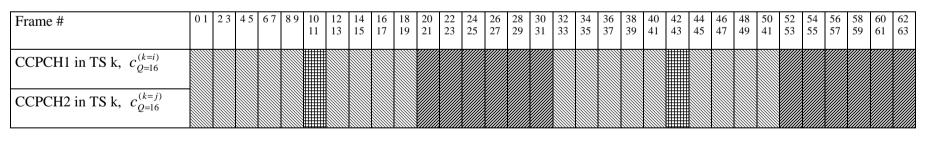


Figure CA.1: Example for a multiframe structure for CCPCHs and PICH that is repeated every 64th frame (128 sub-frame)



PCH 13.2kbps	FACH 19.8kbps	PICH 2.2kbps

Figure CA.2: Example for a multiframe structure for S-CCPCHs and PICH that is repeated every 64th frame, i,j=1...16 (i≠j),k≠0, 1,(128 sub-frame)

Annex CB (informative):

Examples of the association of UL TPC commands to UL uplink time slots and CCTrCH pairs for 1.28 Mcps TDD

In the following two examples of the association of UL TPC commands to UL time slots and CCTrCHs are shown (see 5A.2.2.2):

Table CB.1 Two examples of the association of UL TPC commands to UL uplink time slots and CCTrCH pairs with NULslot=3

Case 1: N_{UL TPCsymbols}=2; Case 2: N_{UL TPCsymbols}=4

Sub-	Case	1	The order of the	(Case 2	
Frame	(2 UL 7		served UL time	(4 UL TPC		
Number	symbo		slot and CCTrCH	symbols)		
1 (01110 01	5,11100	.10)	pairs (UL time	5)	1110010)	
			slot and CCTrCH			
			number)			
	The order	of UL	,	The o	order of UL	
	TPC syn	nbols		TPC	C symbols	
SFN'=0	(1 st	0 _	→0 (TS3) ←	0	(1 st	
	$UL_{pos}=0$)	1 -	→1 (TS4) ←	 1	$UL_{pos}=0$)	
			2 (TS5) ←	2		
			1 (TS4) ◆	3		
SFN'=1	(1 st	0 \	0 (TS3) 🔨	1 0	(1 st	
	$UL_{pos}=2)$	1 —	1 (TS4)	<u></u>	$UL_{pos}=2$)	
			2 (TS5)	2		
			0 (TS3) ←	 3		
			1 (TS4)			
SFN'=2	(1 st	0 🔪	•0 (TS3)	0	(1 st	
	$UL_{pos}=2$)	1 /	1 (TS4)	1	$UL_{pos}=1$)	
			2 (TS5)	/2		
			0 (TS3)	3		
			1 (TS4)			
			2 (TS5) 🖍			
					•••	

Annex CC (informative):

Examples of the association of UL SS commands to UL uplink time slots

In the following two examples of the association of UL SS commands to UL uplink time slots are shown (see 5A.2.2.3):

Table CC.1 Two examples of the association of UL SS commands to UL uplink time slots with N_{ULslot} =3

Case 1: $N_{SSsymbols}$ =2; Case 2: $N_{SSsymbols}$ =4

			r	1	
Sub-	Case		The order of the		Case 2
Frame	(2 UL SS s	ymbols)	served UL time	(4 UL SS symbols)	
Number	The order o	f UL SS	slot (UL time slot	The ord	der of UL SS
	symbo	ols	number)	symbols	
SFN'=0	(1 st	0 —	→ 0 (TS3) <	- 0	(1 st
	$UL_{pos}=0$)	1	→ 1 (TS4) 	- 1	$UL_{pos}=0$)
			2 (TS5) 4	- 2	
			1 (TS4) *	- 3	
SFN'=1	(1 st	0	0 (TS3)	0	(1 st
	$UL_{pos}=2$)	1	1 (TS4)	1	$UL_{pos}=2$)
			2 (TS5)	- 2	
			0 (TS3)⁴	- 3	
			1 (TS4)		
SFN'=2	(1 st	Q	0 (TS3)	_ 0	(1 st
	$UL_{pos}=2$)	1	1 (TS4)*	/ 1	$UL_{pos}=1$)
			2 (TS5)	_ 2	
			0 (TS3)*	/ 3	
			1 (TS4)*		
			2 (TS5)*		
•••		•••			

Annex CD (normative): T-CPICH bit sequences for the 3.84 Mcps MBSFN IMB option

Table CD.1: T-CPICH pilot bit sequences for the 3.84 Mcps MBSFN IMB option

Primary scrambling code index n	Slot index i	T-CPICH pilot bit sequences ${\cal B}^{(n)}_{\text{T-CPICH,0}} \dots {\cal B}^{(n)}_{\text{T-CPICH,959}}$ in hexadecimal representation (reading from left to right, then from top to bottom)
0	0	B8BC9229F99056BF241881D6EDFD552DDED31C7E5CB4830D2C88B7949337D640E518702906868AE4 F0D2E4EF09DCE5CD845CAF825488880EC5FC89408420FFD854389FE54E5AEB782B4447049A3B1810 C3574F0DB9C88A8F0DCF11ECE48ECC5A872D9EB65270EB5113004A8500E6B7EEB46A79CD5B9E1742
	1	A619B3A7F98FAD8EB1C5A49B826DF7E600A2A26565B4B31079586E83F864340538C2BA87E957A7B8 FC30E32CFB648F8529110A492AB99CD6820E84064C6F8C1E08CBCAF8492D97A0CF135BCE0ED9C484 5ADDE53A1545C943D4982F0D1CAD790BD7B349959C840C4B1798CC9C666EC934EC54A4A5E42AFF00
	2	4248448A60CDC808CEE8DA329AD54888F3B74035717A9ADE41A2EC0AEE4DFD006D4EC2EB5D72D50D 9DC8A76D9646749EDC6003918938455DAE0A5C008A008C3074A58F00D88FAB9B12936CC672528C36 24B9CF484EA0E91AE617B94A9B4144C9D1FB321B16184187FDAC28C5495CB94F41C819096626641F
	3	E7D15E21FAEEAEDE08C75EC4CC49C9C9C30BE4098C1AEDC781D99C13575248A207D51525A52964D8 FF62E2D64FCA2CF838A96FAB92397AC4B48CE614A8EDEAA0736CEE29275951CC189A2012D292E433 E098AF3C01B43D10B946355CCC55C1F85BBEA6C80794FEF080793AD070F104C10CAA8828B02E7B4A
	4	64EF0E94CE9129C86724EB94583C257C647D63548480D9344CBFE1A9D28163E549AF594EA6D25AAC 1F3E72FFC18109095600C2DA848D2382AEDBEF410C374C20C10AA2DCA53A7983842DF2CE81F57051 8299D57D9E97D4C90AEEDCEF16646A0416C968841E12B7672C94FD4816FE154EE990290849C2EE56
	5	1D922F3889C4D6606EB1D622E65EA16F4F28B40B49E90C49B62E84F1E4C04D2D4345220E9008E1A5 C45C8AD0872E626FAABA048CBF75D0082C3A706C99842A9B6B1E0ADD4A5820402C43535768650B38 0B80594224E7B531A46CC15BAF3A18E913C2C43EA15A9CB716636CDDF76BE4C8488CB8F8847080F0
	6	CE94A497F0BF9CBADEC3C49D4D94B076889E24B55C0583851C30787A2427044AF3B8CE94EF101D4E 2A4008557E924862E1116261C4C4D4F89A8262C757EDE1B71EC054983482618B288D698E48FD6329 C213076CE28C85B0D1EC918782C5B0083868600C9FAD0469CDE6915FB2481A4966E71B2B6838E023
	7	63B60CAB008C3BD59577111A4818BB84A61C99D08A2C84CE954818DCAFE4999EAED0BDE9078234D7 92CC2F9839BE4AE418D65B0392C10D58501E4967E3445315900C2691B27D23751594BF21820D2D31 0509EE6A4222B21F0A212EC8453E8C4AE9158DD1BD4A8A9D98284A55313CA8ED508896A2A8C522D5
	8	A6D910704AFC9CD24324B764913B7E20DD71E4F4DAB12543658168AC14CA9095E9C8B54FD1C00A8E 1051A1CF30A363E4F8F749AC48A1828B92A6EC411925D2F1E7F1D63410C93E2DA43ACDC96E6D0674 9547E387DA5BF4C0024DF044A71354CC74E7CE9B92647216ABCC16BC26EF0ECD8CB8C806BBE4E3D9
	9	4088C20812CEC1246ABE6AE55EA2C842C7F56E1B9E4BA6C8CEFE187C56D48637CC1A83064504478A 741674C048EB018A12BA6C5CB790EB0382ADB2E9E689ED79D3C262917D4B9DE30C5F05ECE97CDCEE 42C80CE72CF0D1DFB1CE4D9A85DDB46879CC8009DCF84D62BCC489A14D49D949852E32A6C468F154
	10	24FB5A5C09ECD46F410A52349BC0C4E080F5579B29C3EA418407794AC8FE45495564F48703EDC180 D059288DC674217AD2EF00A6C6FE44A296FA485B0928CD88ACCDCFCCF9F9C254E23D9D1E849764A9 82DC83ACBCDDF8F2FAA074A26F48A52F27A16D2970C0BF4DCFC123CAABB6D3C66EA68C1D551BDA6A
	11	C93DD61EA5D6D473E29B8422C8D14D8A035B692327D6492F888B42A6578B01E9061DED09237CC071 31A1F992665078CAA72C7F51C7F00EC64E28989E56E2C97902B88D226446B46A26AE4C68CC4F1A0D 1B1AD23242F9484AD0F0C1CD4C8863784138C48D6F711DDE890409D9A5ECC2001A828929D93247FF
	12	CD0E265B8DF204AFDC655FB7CECAF603B4E0EA685E97BE4E64B85C01A414C490C565485A19EFA8F5 C10B1A31A9E841369502CB0E0D5B32D3E120ADA0EE07DD7422A5808386EC474CE750C88624090129 6A12600AD616E1463C8B3BAF6AE08C4A2B585700B028DD0C440DE4B06CA8856DAFBF1D17E5478B67
	13	36F087C42AE04202FC029EA0A8098749966E394ED214846821196EEFEA23185C79A68584351BAF40 0F03B5ACED8CE7FADC884485B448900C4C1E5C79B15CE489213C66580F35CD155516FCD7845AB694 49D48040E2E8EC17C2EC8510E1AF70377E0A26E3EA354AC35F5588C386ABB6A0213082D7E7245545
	14	C5E241B1C1F6F78AE0192A590FC25DE1AE529BE2F554806451197AE4B65EDFC26200CD0BBCB95B70 F0A4D31F48E4B411EA390D821A1BD31428BBB50CC0C99B03CA194BC9E4BACCEE0ABA2DE816414E1C F550D55989A18FE8E5C36AAEFDDAC6C2A50CC2898E8348175387D8FF15C2D618418826911EE07E17
128	0	6A1E8328A92DD0BC88C805C2C69604C3DE84E19DF5AA89942E66F9FCCC41A8C26B604E4D8458A576 0CEE09C8822CC068075318E1B50263DAC873E02347FBD25191D5859C285866CD8E80BD27B7604AA2 2DC6DC7F8D8953A52B00D9C896CB5CD62388FA050175EFEA0BC2ED888FB9550DB0F5819F90186C6C
	1	5EA97D8C6A17B02A01BBE2C589943DDE2FB17E827FE400F6DF582700B244865CF8D4D20C912F380D 6494D81AD350219C1EC7A5FCF8504B81B89BCE12D845A38032682C9BC6C5585AEEE47F4A1F95B968 84C01446E2A46DC0013453FDF6300F67840231CC8D53C7A447420A28C999EF3866C12B084C0C3D45
	2	C63FA876D54C06CA8D1198252AA2D79AFE579FAC8E39954EAF5CE8CB1B680C49B24000C042C24C36

		EFC64961BF69A09688900125B82654479A95C4704E950C9C5E4136E5AC3B31CFB4261D12D6686E2A
		6C1D68C1A923C0D1610CB56EC46D78086D22448D5C08FA75C077525BC58173996904524A6CE04198
	3	A009CC8B8EABE248CC2E612E7F3408BEAFF1FBC3C8E7F6048A2AB9DAC3056D6A93C6ECC927A835C3
		5718CC12983D4AF24FAD84989E7D5CEC29DF607CF0B68141955B107C098AE83CAACC03C0258140A9 E477D338028C96A84A9D5B00E94A45A1D0A09CED0072060DA0C0CC8206D35D880984959B1CD8827B
	4	8ED0C874B6109F08704C51D4788AD52A4915B3E75542BC421C882E94F3C82A6A6C9CC02E1018B41F
	-	0A1D70B96FCA55DC66E5D04688A638C22088AEE85ADDF422F1E5E101F6208056B4209A83F7499258
		B05197BDA6F2A2D37B412C98860DC0DF388FA8BE1CFDD87646FCB8ABB479D296D77C4DCB4E9809F7
	5	C65CA06C3386A8845C5284202B80FD53F9FD56FC4A54C4A762867552900E48EE2DC742C34D926624
		4DA4BD86AC5E1F1764878A675C024777D8CF3DB9AF9D75728061A47F58BBC28CC6A54E8909C495D8
		97E324C96C3427CA493EB68DD5D744DFA80A9710D60FEC963EC0894AC1D736CC0F1DD7029CD569CA
	6	5878BC84924406251337E2C101D84ACF291C08CDA72B0405FF40C2B944357D330A3A6E144028E0C0
		2B00C63BA0310CC392AAC2626A9D80BF18540DDE00152CCAE689814861085F54CCBBEC97753EF03A 4C2558DFE7F1081C5F2B9149E4784A8F8ED5403D1D311DB0AC221E974DE792C198802D927EC98E1C
	7	654C6915BE1ED93C9278589710E51E0C6F26348A30A01BC69D1CC02DEFB4304AA631CA84C2235C2B
		CD45420C0560CDBDB4F016483361C8A1C57A396756D654BEA337EA6808CA66913CB495ECF071CCA0
		85978CFD284A2AAC1885917A9121A8ED4658EC3A1AA6D06C28E9441C133CD50A3052C06582784EEB
	8	60C55B146D808554AECFB07F70AEC905B8BF094D58248CF860ACB4194920C87C0CCD07BC228ED527
		5BBF8AED0D7C1B8125441062B4D4F3FBC9E0EC788441F58856A9A3A040C14D65CC8C2D200FC76538 472048F0B5D13E4A225D552380CA8858D304C2CC26782EA0D4307FCEA84163A4CE5418188F932C5E
	9	2B13B8061528965ADEA41890CB013D05CB7397F94B15A0804D40001E862841633D6E58B36B9CD443
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	12	471C41321B7A781EA0DD019A625510A9DA4062C40B58869809C6850376C3083E4E39266DC0A8E331
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	13	8DDCB00E9018344546E7CA400C406C49153D96D5618B99CF4C6C2496312481AF50580E231CA78629
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		A28DD51E580CAC3473A8C087907602BA9A627CC966D5E3801553D986E2842C10E2C9E6ADFEA60645
640	0	138D98B4815C8984B7DC08B87C868127445149E316DBB49C1C9F4B226E0A02385A5CD2A895F97CDD 801FE39DD4EAE41CCA8CF6FD693C7300E8E641094808A5A6007ACF62CB91A3C87D571F0094424EF5 E12E7EC5417B9825CDBEF6D9E59F654953DC8C988008CEA2706FD4E797AF0508088A2828F10B1D2D
	1	E158EBAD648F1D4C89883C537A89DFF151E344C8AC521AC0F48971508627D1C5A546B16F134CF4CA BEACAEA628E4F845DA66D45C14983F90100F94FF9400507A8D6239405EB186A504653D2AED633CD9
	2	72049290CFB9E81C54E04828A9C0DC9998C6950C1BD9D70D85375D115049F2231AA7C1F592CB4A7D 2020F33A1F67956340CC43E28A18418A6B0ED400EC0EE9B3C94689DEFE632204EC51A80C5FC9F089 8455BA6D54949B67A5D0704A7988723007E088C1C3E104D42F28687400EC2D2BCEA9C359C61CFDC8
		4B185DAAC7BD8FF7A544EDABDFD640A7D72BADE148E481002EBE64568D7D70C2678E37EA1685D6B0
	3	871CACD6880544988157EAA226AD8D020C75CD109222C8CE55C894248E8C6D8F68249D63F1CA3CB9 5541BD1F88B52CA2D5C62681C4260161B544A569AEC0CCEAD52E14B7CB06607CE415194DD2377DCB 0375005DCB1639D983C67150534E94DCE0099C4CE6C17430A68108C1D1BC4596DB774D797E12ADEC
	4	C5BA82C4171A25CAAF1D53C5480D8C500E8588258090F38155BD0D9401F45E2700C99C4808776EE0 284B58F4345DBB851782FD0F4E891C3D4C5CB9A98D595866152E88C3148C94068B61863603C224E2
	5	084020C0F6E78D1500A8323741217AF7808D7E85975BC3461DA398C70D55590E32F6E6403A5C8A8C 13CAE785764E1AD020828D0119416C58DC8C6BCBE3B8B664CB2E4D80EBFC46CCCFE27CCC10D4A25C 557543509C7D8BACAC5BC4AACF51645CB8C408B820C015666C3B14A3149B2884620840C926D90B56
	6	0A307884C63CA66B582919A8A18A39071B89770C5C44E20C39AA30CD68C11D4FBAD87E9A026AB421 064202ACE41AD49CA9D068826CC22D13F055A83D18BB52D9B0A056252450140CFB1E89C70BC9B4D1
	7	EC05D9723C448399171FA4A4558C420A60001C70A9CB355B0794E580562A50C024680BA7B3F02BB0 98AD1CE1114022723DCE739CBA16DE70C04725AAE9EE4C671C586DF064A5CA295C8E66C4EC86D9D6 21B78C8061BB57C01FE591F46223220A9E062D422589987082CEAB141BFF921D4B21C8C90E7E0A80
		20B9E3C9026D12590C42197287948F22D3FD977BAD2B90B74DEB6C098647AE55002D953E48C434EE C78E4D5547838014EB8066644C209AB4EA1229FCC121DF6CAB62B14AF9888E37801D3DD1D3506832
	8	4A0E3441EC8A5AD6D5C1D21DC4890C06E39E018039A7C56E81291DA4805D096DD1C16064959910E8 5ECEE45713B07F41502328006178ACBA0FDBCBC6B457A786EAA50E1A87A4A84C5C8DA06A8B4747D7 264997C84F0FD440DBA49EFD3D4AA8A8AE67DB122700A2D805DCA170856C5273FD3C8C82DB05A192
	9	B1523862484C051A901F2A80FD1CDEE46483649324090D944CDC65E8EE37BF50C249E399C829A4CB

		3358A8AA5CEE1C2A66AEA1CF3007885E12E73CC5D7599801D600A749666321E39BF0CBCA77581B93 89C725322799B7E4155CCE85C484D0D5EE426D5005C4E10C25A81DCE699EFDCA1EFC61FC1FA813A5
	10	0439C8F3B954205BF68C434E9480E4473441E16D83CCF12EA54179BC7E14FBFAB4137AC232D57B2E
		807CBAE831A4A1E1A1DA1003E0DA48A256E760A3E60F00406C21F85DE87E9D914EE6590D809166A4
		1742E7ADCA8E48D7CEBC9643497DB20A426A5591840F5089458430346444E5AA904460298824C144
	11	B469FC749052A6838980075486A7533B9914550CD2A8BC78BCED04478C6BDD5864DE1ECC826C4D45
		42AC1D7AFE1864ED85CDEC6FBA2D4C9B8FE42F601DA00F86AC4F5BA88280A9A52072D95B2A7103AD
	12	9C8E5BDE0AE91498A6ECC8B08C825B42DD8DE4D7AC1D30BA295B2DAAFD024BB04A54C212309CA3CE 68A5B8D8DDFC53E64D4C9D4A45A6C88A9B314A2E66F214187D7A98DD9931463BD2BC0B58DCA01688
		5779FA4E61E421151028B74C8D583DDB698818142BE6E130A74D875C0E415C8DE484CE81854C2440
		CA36C879F2A9949241C06EE51759BF6D882FFEC19A4F022D6485AE129E8C4665DDEE8857206B28EF
	13	C748FC01802B268F11044E28658E35B74845A9C35AA5029673EBACAD8F838F664857F9ABF8888EC0 180DB550E6F27E60E5B4AFEC6D7C34E0A12052DF008EC9422A2E8012E97063B80BD24648D3AEAD42
		D0F8E392BA037894A805DA01E887F8DE1ACCAAA98B5C2AEDAC1C5D8202509D8E9FD16CA499080607
	14	5C02AE4063C16081D918F0A5249B7A64C5EAB1D6A77CE405447E2C1C121F919C0D3B073082129A85
		7E4A7091B0006CF059C2682980468EFE09B56A8DCE6BC5D880046CC62288A590C9AC0A08CC5DAE52
700		09C24AEC94759DC9A2E05C79C0ED09F05B2BD660C91E054BEBB5294F09D93DE85AC60A99ED6E1845
768	0	15E21E6B24200F1FFA8985625F766D026C46898996945FC504D8499C468728735C756CBD6A92155B BD6CFA674CBC9D0B090A9ECDE54587ACB0688F9666C0686EB217BEA2754AA65EA264C9198199E264
		4B02CAADEC1D45DC892774385A904F643C66EC14BAE65C3267F0B2413C22A921C6804F85026014C1
	1	C50F328B4C5C48022A8E0CE14393A8456D8EE9DA6DE5A36223B41D9C0ABA3B4820D92D29369CC90D
		77866629041BCED58A2AEC947C8815781E94C49639CE44DD125887A49321CC1ECF841D55880B7FD5
		08854192A444D9FC042E45C19FA92B6FB94EA5B8CB521BE1E06BE2CDDD0048DE095FE0EA26CB5434
	2	B77D70563885A1E0E502B45E9847643BB0C22B44B4050F5CB47ADD09C2072E60F8E1ACE002F65A6A CDE91B545D6C7E685D02F29216D84B248C6C9D47DA8B7ABB09F08CA601B0C51C64CE8DD9C3A83040
		66A825E8685EE9A15F4C3BE47B1385AA8A8F8916FDADD94B22189DA69774C6608D9246A9C61436C2
	3	20046C0E3801B9CEA71B0DCB5CACD5C51ABC028D114C036CA5D06FB44A428F36CDAD37A4CB548759
		864B94712C2043F51D84E740B8DFE64E158018A41A17D0F5CD3FCC41CF0B44D16880F51C81680045
	4	214998AA2D2A5B02F914C696A7D6E49300C7A70CA788200D5AC8F82B59C4625E91002FAD8605DC58 1F169F9838CD517840B079EDEE61F3CDD2751B3409492D7B2DCCB625CC18744E59FC42C838FE40F6
	4	1A963C616A087DEB046FE80095BCBC28A06C44AEEC504016940924EF6AE1AF545B6180E9C4DBF849
		9EC85F857C6958CD8C4D5E7F710240BABCEF22565524CABD1FE6367E9EE50FE6F087CCB9C69F5615
	5	6346FC9AEE28C0048951272E3A64960D4A1510DC1BD9715F6ECC7C3B88EFAF1D915819491A935A67
		6940CDCE1C34EDC5E5284B8797B5016D18DF8D7C0FC80504A4F63AA51EA5389880B99548C4A04455
	6	954C245D1C649AF8B133C108601C09431D0FD63E7E41FD0F3116BDCE16CD77B62BE9D85EFB595266 9728C4C4DC66F2709EE22543B509EB6302006F0EEF939B85CD09268FBF0300A380842677F0609609
	0	D582B8B052A8D4DA9601399284A43C4874A5059104292489FD1F78AD52120F152C69F0A1459D709B
		537050E421CCD096309CAE0E8E8C6752AA10589A2281487ED001D9D111006D955D841C5A1C6D201F
	7	E9A00C8880DF2784030486E650254748640AD06C0ECD914F0A73AB904CB8085074070021024FC612
		896272B5068BA10EA50E2B66909CDC5BC3AB7920567019EDD44C7B119B8E404D08B0DACA34561E7F E85A251CE166E4C259F1848866F9A7F4DA644C7C4C2A85341465924BD705214F5A8509A7E5003428
	8	B21CA5DB7DCDEF97D50219CAE77EC242AA58DC4378E11874A50D0FCA45805366C82927F51CA42809
		1C404D4821FCCDE34052463089FB320F541181E698D64C2F1D5AE7DA8A9B9D4716902815545FC845
		2E72A869E8ABACA4E812BBDFC80AC1B4DEAB64AAA1803B392501068E6418A8F418A7C8AA29C84C8C
	9	02F0AD8E99A24D3CD4C02B3CFCB0D5349EAD59114B05752129002406633AF9A069F69D6032C10D9E
		4C424D16B016FA58D6CB40804E90601CA4595FC0BBDDB7C8FB7C0BB4C21C841155D46938A888CF98 F12650E61C6EC4C1FACFB542D6E5CCF3096A402DEF5AA31E133CCF15C9A45B0CAA485250E041C461
	10	6189B50C25863E82FC3D5A843CE8F4D84D4373C2CA5C8BC0C0A389ABB478CD52DF9C4EB448481DC0
		D4150643A2DA896F51742A82BA0986F1662914B2926593A1510E077026C51F8A7F88DEEEED4F16B3
		E50E8630AE03FA570AC753D18551D2D9C64005A2954D604DAD9D798E4A589760076A3D41921603B9
	11	8049797BDA828C0012AFAA3266E044397F57E538CE3C0C174248D00E2D89FBA46884A549684D1E24 C8AAB885A1176797446874282042880A62534D840EFA909C86EC4C6BCEB48DE1BF80B3AED94C71AF
		94D6C750E402DB698744787B0A6CB4A664690C07CFAF56A4B6DC7BE55407B6C52AB19CD559483F7E
	12	40591C4191A1E8E0B853A463A7D805940800F389ABD07003C599D4092041CD4C9D310CCA3E4C6EF1
		A1784AB914E8CB729DE6BFF0847A1DCE6C8C046D317D29495316AED1B6FB1891CA890C818DC6E028
	40	3B2043D4E02ACD68A74EB66ADA9F941A99D525ACC04F9CEA086F578D1A6C5B8B30985A187E8CC7DC
	13	504E99F104FF9FE0C9A78CF29682C49B0E2E74FB2E20EC419DA401208F6C993D03E8148A3297A485 C4E18A2D3A9CA7ACF940F7DA50DA3474FAE9BB5B35AA7CC2C17F652E728200799B7EEA89C4B04E56
		DDA5DC588F89CEC1E280CD48000B13165D9AF495EE672829C5ADC42CAE6901A4F910A4DC406CFE61
	14	15C15542F044CC049F0E6550AE45EFA5DBD76D5298C34AE8D6CCC62440DA4543CA78058186A06C53
		F4C74BCE7B4AC9F12E2D4DB884A6EE6E6CE79996035A2964E40A22F1F6CE3BB19F841279354B228C
896	0	5C1C95CD29A13884102378E180B5A489B064FD0050875ED44849108FA1A09218DF61A21A8FCB6B6A 400A0A000B9A5DA2C21814C6FE024101E699344E89C46C773CEE08D14D5E225A94C5AECC6EC12006
090		0B152FD950CDB59CDA552F2A85CE418D2CAA864D827503F49C2E2EF02243A088E5A187E5968019E4
		5D57FC96845C39057BC419B3B69BB6970F8FD4E035DA0C9C14BDAE4C5A280FAC030800F14ADA8CEA
	1	4455C04B07B8A84F81A05237092273284397638305F91971C9E867A0C86341AA5219F4DE9EB420D9
		ECE4D4E2C2CCD5BBCC2CE155591D2EE949D2B3149D411C1C7A145E439875A7E3F8704C53E4C09828

	4CC86FD4151C768EF771F840C4C477E019FC249436C267118646D4A07468864DEA4CA781825C505B
2	41A9C458FAEC095BE34D11978C96344F340205907066B8ABFC6EB6F53719583F96D0861C774129A8
	4BC4F94C5EC2C1C44EA5908FB4DF46456992425E119C86E0A467EE436008DB4657B6D68892FD3886
	548DF6781740991D7828A5B39452ACD101CCA411C4410AA0E880D38C0CD8A37C6B6D6477CC20B9ED
3	0C0660753C1A2C8DE6CEC2AC4C03F541CBA8CF27078D5E582BD62E3B87DD0C624543534410437383
	809E0C066FA2C676C352BFC7D35EC6E86CBF3E1CB0572E2D293B60A5C5334DE790BB6C7C43EB8418
	39C0CABD205B006185069D842AD5CB9226659ECA8EFFD5C16D2908678CDAE4BEED04C4D35C9E7821
4	65CD384F2B9666D909DF68CDD637C33C1696F5E819784A8A2AD6CD9823EE1E40DE62CD1272440E5A
	524A2603CC24EE6498CCFA1C919F870458140D851A0CD0E571196974BDC30ED8918CAAEC12446ACA
	CE0F4F080A6C9887D96703CD88C7E49AC3648D7F0BC72B7DC9B1A1D4B1CAF3A46943A680F849ED9A
5	E52994D6BDC01558000D3F22E416BB651A5E194EEE823A4C05793E665C5A6BA77960FC1081B6355A
	BA480753A0EE860434D01AC81DE4092403D05E12B0468A65A800C82447977C814A52326415FBE568
	1BA286727FF095384C288DEAD496C4E41E99C62DA8B62102D420184487A48043E97B81C053041C72
6	28ACC0A9E893A55F1CBBCA24BDB83295E813168BEE80AA22148CD06F0F608B8AEF2E4C424004EEA5
	B000E8C90CDBD46ACC5385110D1E470F8F66E6012706C025292C8D1F302955D2E1B64AC11B65AC0F
	9124D981E19DC8129B6C2928687541187FDABFF5B7FA354814F523464FB138A54488970EB455C0D5
7	BDBB40572F15AA8050CD6F44E23D8AB1A9D9157A909716E41BBFD6C0E884E10E58A4E27FCCC45091
	E689CC84D458D14B12FAF47CC4C0CA9DCA15873FD4FEC05AD00989BC06E24F6D4F82400EAF0B43C5
	E285E2CF365E63448D42B0E20F89F461807055CCAAFDAA123374CDC3B364F858064CD30C67710330
8	A1CDC0AC064A07BDE5F496CCAFA3C91A98CFE182DD0C54F9ECCE25E981D129A8A23B630E8C78E0DA
	58742533BB3D2A2FEEC1C139AC9DD60CE2083846F4B0C303E9E5999DB105E7E9C6F35326BE895580
	4BC4AE86C4155D02966887724BCD8FC0E44DC118546BA6AF2F82EA4EE80447A418B8CE492CF49ECA
9	EC1C57AADEC8FBBC0B4140BC8C1D38DAC1416C48D5B482C839C469803288B6454FA8718D80FE92AF
	81BDE6EE147C5EBEDD8730D582C141C001730D43021360E25D1C1769AEEDABD44F4E6F75CDCC9018
	74A2E6C88B460A49501CD946E5FE0725EC9C68F6DFAB1D74CD55CE3C909E9065863022100A8C2F03
10	1CCD864CA6FDC0FD6AA18EE7B48A1F6B214645141D07AF691CD58C8F82DA596FC931023DBF026C0E
	0282A1798C069848668CE08E82902E72BD6D46A381D8AA922DDA785A6858D85CCCF8F28FB8CDEF98
	9B04606D9B08B8ACDD09CD5545EA4DDA4E548E5B587D1E894D50725E0968C0F949EEA3D5DBEC826D
11	9BD4603A5C0BAA644862019295B6F09CC05CAAE86306DF955307116D1852005A98C8EFE844ED14C4
	A49DC462F596130E492C7DCCC47D64FC0045EAFD1E01CEAAF6C38255CB7ECB4446174CACAA116ED8
4.0	5A7050B48ED5B178B8F2A722544C90720DC9961E0AD6B868AE9DB5E045C6CCA35DEEEE08B9E6E58D
12	C0A81E46262DE865209B11883FC6ECD70E049C8341EABAC7D8B8E615C2027A820887866E12B86F2A
	FA70A8BD50A049203A1D7188006422598E461C27749329C00090916AFD453874AD4EAC9150B8C4AD
40	C5E25FD38AE19C8CA6A4CA1244BD37383AB8BE81181944579F93C3D3CB7E04C7977CC0600CBC6FFD
13	7124526DAED23B9E828FDD9B9E8B3D4C214E87148BE9DF3AE1890EEACB11569EAC09E5955A160CCE
	A0A9EAD06B3C96B5A395A6B32A8CF1F1EED05ADB4EDDCF49882B202D1CD4BA67E248730D2280CC27
44	02D100406641C0E6B7F0910566C1AD0461A807CFE1BAE09EEE4660B55A4EEBC4EE122B0ECE694E8D
14	C3AE1C4C5C0BF009AA4D4171F41786A49CC55A01C5C5CD9A56F342E9B870650E88A1A48D0AD96F66
	8448A9210D83A655448F7AA2024D1DBCDB49ACC485C3EBCDD7494D5406D590FE5B74ED031C076588
	168BC607880040641BB6D65E0F5FDA160C32C671639FA86DE4E36A1D7454B40C900A93DEE3B4E10F

Annex D (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
14/01/00	RAN_05	RP-99591	-		Approved at TSG RAN #5 and placed under Change Control	-	3.0.0
14/01/00	RAN_06	RP-99691	001	02	Primary and Secondary CCPCH in TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	002	02	Removal of Superframe for TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	006	-	Corrections to TS25.221	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	007	1	Clarifications for Spreading in UTRA TDD	3.0.0	3.1.0
14/01/00	RAN 06	RP-99691	800	-	Transmission of TFCI bits for TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99691	009	-	Midamble Allocation in UTRA TDD	3.0.0	3.1.0
14/01/00	RAN_06	RP-99690	010	-	Introduction of the timeslot formats to the TDD specifications	3.0.0	3.1.0
14/01/00	-	-	_		Change history was added by the editor	3.1.0	3.1.1
31/03/00	RAN_07	RP-000067	003	2	Cycling of cell parameters	3.1.1	3.2.0
31/03/00		RP-000067	011	-	Correction of Midamble Definition for TDD	3.1.1	3.2.0
31/03/00	RAN 07	RP-000067	012	-	Introduction of the timeslot formats for RACH to the TDD	3.1.1	3.2.0
	_				specifications		
31/03/00	RAN_07	RP-000067	013	-	Paging Indicator Channel reference power	3.1.1	3.2.0
31/03/00		RP-000067	014	1	Removal of Synchronisation Case 3 in TDD	3.1.1	3.2.0
31/03/00		RP-000067	015	1	Signal Point Constellation	3.1.1	3.2.0
31/03/00		RP-000067	016	-	Association between Midambles and Channelisation Codes	3.1.1	3.2.0
31/03/00		RP-000067	017	-	Removal of ODMA from the TDD specifications	3.1.1	3.2.0
26/06/00		RP-000271	018	1	Removal of the reference to ODMA	3.2.0	3.3.0
26/06/00		RP-000271	019	-	Editorial changes in transport channels section	3.2.0	3.3.0
26/06/00		RP-000271	020	1	TPC transmission for TDD	3.2.0	3.3.0
26/06/00		RP-000271	021	-	Editorial modification of 25.221	3.2.0	3.3.0
26/06/00		RP-000271	023	-	Clarifications on TxDiversity for UTRA TDD	3.2.0	3.3.0
26/06/00		RP-000271	024	-	Clarifications on PCH and PICH in UTRA TDD	3.2.0	3.3.0
23/0900		RP-000344	022	1	Correction to midamble generation in UTRA TDD	3.3.0	3.4.0
23/0900		RP-000344	026	2	Some corrections for TS25.221	3.3.0	3.4.0
23/0900		RP-000344	028	-	Terminology regarding the beacon function	3.3.0	3.4.0
23/0900		RP-000344	030	1	TDD Access Bursts for HOV	3.3.0	3.4.0
23/0900		RP-000344	031	1	Number of codes signalling for the DL common midamble case	3.3.0	3.4.0
15/12/00		RP-000542	034	-	Correction on TFCI & TPC Transmission	3.4.0	3.5.0
15/12/00		RP-000542	035	1	Clarifications on Midamble Associations	3.4.0	3.5.0
15/12/00		RP-000542	036	-	Clarification on PICH power setting	3.4.0	3.5.0
16/03/01	RAN_11	-	-		Approved as Release 4 specification (v4.0.0) at TSG RAN #11	3.5.0	4.0.0
16/03/01		RP-010062	033	2	Correction to SCH section	3.5.0	4.0.0
16/03/01		RP-010062	037	1	Bit Scrambling for TDD	3.5.0	4.0.0
16/03/01		RP-010062	039	1	Corrections of PUSCH and PDSCH	3.5.0	4.0.0
16/03/01		RP-010062	040	-	Alteration of SCH offsets to avoid overlapping Midamble	3.5.0	4.0.0
16/03/01		RP-010062	041	-	Clarifications & Corrections for TS25.221	3.5.0	4.0.0
16/03/01		RP-010062	045	1	Corrections on the PRACH and clarifications on the midamble	3.5.0	4.0.0
10/03/01	IXAN_II	141 -010002	043	'	generation and the behaviour in case of an invalid TFI combination	0.0.0	4.0.0
					on the DCHs		
16/03/01	RAN_11	RP-010062	046	-	Clarification of TFCI transmission	3.5.0	4.0.0
		RP-010062		-	Corrections to Table 5.b "Timeslot formats for the Uplink"	3.5.0	4.0.0
16/03/01		RP-010073	042	2	Introduction of the Physical Node B Synchronization Channel	3.5.0	4.0.0
16/03/01		RP-010071	043	1	Inclusion of 1.28Mcps TDD in TS 25.221	3.5.0	4.0.0
16/03/01		RP-010072	044	-	Correction of beacon characteristics due to IPDLs	3.5.0	4.0.0
15/06/01		RP-010336		-	Clarification of Midamble Usage in TS25.221	4.0.0	4.1.0
15/06/01		RP-010336	053	-	Addition to the abbreviation list, correction of references to tables	4.0.0	4.1.0
. 5, 50, 61		510000	550		and figures		
15/06/01	RAN_12	RP-010342	049	-	Correction of spelling in definition of beacon characteristics	4.0.0	4.1.0
15/06/01		RP-010342		-	Correction of Note for PDSCH signalling methods	4.0.0	4.1.0
21/09/01		RP-010522	057	-	TFCI Terminology	4.1.0	4.2.0
21/09/01		RP-010522	063	-	Clarification of notations in TS25.221 and TS25.223	4.1.0	4.2.0
21/09/01		RP-010522	062	-	Addition and correction of the reference	4.1.0	4.2.0
21/09/01		RP-010528	058	1	Corrections for TS 25.221	4.1.0	4.2.0
14/12/01		RP-010741	065	1	Transmit Diversity for P-CCPCH and PICH	4.2.0	4.3.0
14/12/01		RP-010741	067	-	Clarification of midamble transmit power in TS25.221	4.2.0	4.3.0
14/12/01		RP-010741	059	-	Bit Scrambling for 1.28 Mcps TDD	4.2.0	4.3.0
14/12/01		RP-010746		-	Transmit Diversity for P-CCPCH and PICH	4.2.0	4.3.0
14/12/01		RP-010746	069	-	Corrections of reference numbers in TS 25.221	4.2.0	4.3.0
08/03/02		RP-020049	071	2		4.2.0	
08/03/02		RP-020049	071	1	Clarification of spreading for UL physical channels Common midamble allocation for beacon time slot	4.3.0	4.4.0 4.4.0
08/03/02	RAN_15	RP-020049	075	3	Correction to a transmission of paging indicators bits	4.3.0	4.4.0

					Change history		
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
08/03/02	RAN_15	RP-020058	076	1	CR to include HSDPA in TS25.221	4.3.0	5.0.0
07/06/02	RAN_16	RP-020434	080	2	Clarification of shared channel functionality for TDD	5.0.0	5.1.0
07/06/02	RAN_16	RP-020313	082	-	Clarification of shared channel functionality for TDD	5.0.0	5.1.0
07/06/02		RP-020317	081	-	TxDiversity for HSDPA in TDD	5.0.0	5.1.0
19/09/02	RAN_17	RP-020559	092	1	Corrections to channelisation code mapping for 1.28 Mcps TDD	5.1.0	5.2.0
19/09/02	RAN_17	RP-020576	094	-	Correction to S-CCPCH description for 1.28 Mcps TDD	5.1.0	5.2.0
19/09/02	RAN_17	RP-020579	104	2	Corrections to transmit diversity mode for TDD beacon-function	5.1.0	5.2.0
					physical channels		
19/09/02		RP-020569	090	1	Corrections to channelisation code mappings for 3.84 Mcps TDD	5.1.0	5.2.0
19/09/02	RAN_17	RP-020572	097	2	Corrections to transmit diversity mode for TDD beacon-function	5.1.0	5.2.0
04/40/00	DAN 40	DD 000040	405		physical channels	500	F 2 0
21/12/02		RP-020848	105 107	-	Correction of the number of transport channels in clause 4.1	5.2.0 5.2.0	5.3.0
21/12/02 26/03/03		RP-020852 RP-030138	107	3	Editorial modification to the section numberings Clarification of number of midamble shifts in different time slots	5.3.0	5.3.0 5.4.0
26/03/03		RP-030138	110	1	Correction to applicable HS-SICH burst types and timeslot formats	5.3.0	5.4.0
26/03/03		RP-030138	111	-	Correction to HS-SCCH minimum timing requirement for UTRA	5.3.0	5.4.0
20/03/03	10/11/_10	141 -050150			TDD (3.84 Mcps Option)	0.0.0	3.4.0
26/03/03	RAN_19	RP-030138	112	3	Miscellaneous Corrections	5.3.0	5.4.0
26/03/03		RP-030138	113	-	HSDPA timing requirements	5.3.0	5.4.0
24/06/03		RP-030275	114	1	Corrections to field coding of TPC for support of HS-SICH	5.4.0	5.5.0
	_				(3.84Mcps TDD)		
13/01/04	RAN_22	-	-	-	Created for M.1457 update	5.5.0	6.0.0
09/06/04	RAN_24	RP-040235	116	2	Addition of TSTD for S-CCPCH in 3.84Mcps TDD	6.0.0	6.1.0
13/12/04	RAN_26	RP-040451	117	-	Introduction of MICH	6.1.0	6.2.0
14/03/05	RAN_27	RP-050089	118	-	Release 6 HS-DSCH operation without a DL DPCH for 3.84Mcps	6.2.0	6.3.0
					TDD		
16/06/05		RP-050240	124	1	Correction to transmission of SS for 1.28Mcps TDD	6.3.0	6.4.0
16/06/05	RAN_28	RP-050255	127	1	Correction to the examples of the association of UL SS commands	6.3.0	6.4.0
10/00/05	DANI 00	DD 050000	400		to UL uplink time slots	0.0.0	0.40
16/06/05		RP-050239	130	1	Correction to transmission of TPC for 1.28Mcps TDD	6.3.0	6.4.0
16/06/05	RAN_28	RP-050255	133	1	Correction to the examples of the association of UL TPC	6.3.0	6.4.0
29/06/05			_		commands to UL uplink time slot and CCTrCH pairs Editorial revision to the incorrect implementation of CR127r1 and	6.4.0	6.4.1
29/00/03	=	_	_	_	CR133r1	0.4.0	0.4.1
26/09/05	RAN 29	RP-050448	0134	-	Change of burst type to burst format	6.4.1	6.5.0
20/03/06		RP-060078		_	Introduction of the Physical Layer Common Control Channel	6.5.0	7.0.0
20/00/00	10 11 _01	141 000070	0.00		(PLCCH)	0.0.0	1.0.0
20/03/06	RAN_31	RP-060079	0136	-	Introduction of 7.68Mcps TDD option	6.5.0	7.0.0
29/09/06	RAN_33	RP-060492	0138	-	Introduction of E-DCH for 3.84Mcps and 7.68Mcps TDD	7.0.0	7.1.0
09/03/07	RAN_35	RP-070118	0139	2	Introduction of E-DCH for 1.28Mcps TDD	7.1.0	7.2.0
30/05/07	RAN_36	RP-070385	0140	2	Support for MBSFN operation	72.0	7.3.0
30/05/07		RP-070386		-	Support for LCR TDD MBSFN operation	72.0	7.3.0
30/05/07	RAN_36	RP-070386	0143	-	Addition of spreading factor 2 for MBSFN time slot for 1.28Mcps	72.0	7.3.0
					TDD		
11/09/07	RAN_37	RP-070650		-	Introduction of multi-frequency operation for 1.28Mcps TDD	7.3.0	7.4.0
11/09/07	RAN_37	RP-070647	0145	-	TFCI mapping for S-CCPCH and 16QAM for 1.28Mcps TDD	7.3.0	7.4.0
07/44/07	DAN 20	DD 070040	04.40	_	MBSFN	7.4.0	7.5.0
27/11/07	RAN_38	RP-070943		2	More improvement on dedicated carrier for 1.28Mcps TDD MBMS	7.4.0	7.5.0
04/03/08 04/03/08	RAN_39	RP-080140 RP-080140		-	Clarification of uplink multicode capability for 1.28Mcps TDD EUL EUL power control improvements for 1.28Mcps TDD	7.5.0 7.5.0	7.6.0 7.6.0
04/03/08	RAN_39	RP-080140		-	E-AGCH timing for 1.28Mcps TDD EUL	7.5.0	7.6.0
04/03/08	RAN_39	RP-080140		-	Clarification of the description about E-PUCH for 1.28Mcps TDD	7.5.0	7.6.0
04/03/00	11/11/1/23	1000140	0133	_	EUL	7.5.0	7.0.0
04/03/08	RAN_39	-	_	-	Creation of Release 8 further to RAN_39 decision	7.6.0	8.0.0
28/05/08	RAN_40	RP-080356	0155	_	Introduction of 64QAM for 1.28 Mcps TDD HSDPA	8.0.0	8.1.0
28/05/08	RAN_40	RP-080348		-	Applicability of sync case 2	8.0.0	8.1.0
09/09/08	RAN_41			-	Modification of the timing requirement between HS-SCCH and HS-	8.1.0	8.2.0
			L		PDSCH for 1.28Mcps TDD		
09/09/08	RAN_41	RP-080662	0163	-	Correction on the time slot format for LCR TDD MBSFN	8.1.0	8.2.0
03/12/08	RAN_42	RP-080977	166	-	Correction on FPACH misalignment for 1.28Mcps TDD	8.2.0	8.3.0
03/12/08		RP-080976	168	-	Correction of E-PUCH TPC description for 1.28Mcps TDD	8.2.0	8.3.0
03/12/08	RAN_42	RP-080987	169	1	Introduction of the Enhanced CELL_FACH, CELL_PCH,	8.2.0	8.3.0
					URA_PCH state for 1.28Mcps TDD		
03/12/08	RAN_42	RP-081118	170	1	Support for 3.84 Mcps MBSFN IMB operation	8.2.0	8.3.0
03/03/09		RP-090230		-	Clarification of uplink multicode transmission for 1.28Mcps TDD	8.3.0	8.4.0
03/03/09		RP-090239	173	-	TFCI for Secondary CCPCH frame type 2 with 16QAM	8.3.0	8.4.0
03/03/09	RAN_43	RP-090241	174	-	Introducing of MIMO for 1.28Mcps TDD	8.3.0	8.4.0
		しし いいいりれい	175	1	Introduction CPC for 1.28Mcps TDD	8.3.0	8.4.0
03/03/09		RP-090240					
	RAN_43 RAN_43	RP-090231 RP-090239	177 178	-	Editorial correction for annex CB & CC Specification of T-CPICH sequences for MBSFN IMB	8.3.0 8.3.0	8.4.0 8.4.0

Change history								
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New	
26/05/09	RAN_44	RP-090531	179	-	Minor corrections for MBSFN IMB	8.4.0	8.5.0	
26/05/09	RAN_44	RP-090533	180	•	Corrections of HS-PDSCH timeslot formats for 1.28Mcps TDD	8.4.0	8.5.0	
26/05/09	RAN_44	RP-090526	182	-	E-PUCH timeslot format parameter corrections for 1.28Mcps TDD	8.4.0	8.5.0	
15/09/09	RAN_45	RP-090893	184	-	Clarification of the transmission of SS and TPC in CPC for 1.28Mcs TDD	8.5.0	8.6.0	
15/09/09	RAN_45	RP-090893	185	1	Change of the timing definition in CELL-PCH for 1.28Mcps TDD	8.5.0	8.6.0	
01/12/09	RAN_46	RP-091166	189	1	Correction on E-AGCH and SPS E-PUCH Association and Timing for 1.28Mcps TDD	8.6.0	8.7.0	
01/12/09	RAN_46	RP-091166	197	-	Timing association between HS-SCCH and SPS HS-PDSCH for LCR TDD	8.6.0	8.7.0	
01/12/09	RAN_46	RP-091176	195	1	Modification to HSPA timing relationship for TS0 for 1.28Mcps TDD	8.7.0	9.0.0	
16/03/10	RAN_47	RP-100202	200	1	Clarification of timing association between HS	9.0.0	9.1.0	
16/03/10	RAN_47	RP-100203	202	1	Clarification of TPC and SS transmission on HS	9.0.0	9.1.0	
01/06/10	RAN_48	RP-100586	204	-	Clarification of HS-SCCH/HS-DSCH/HS-SICH association for HS-SCCH order	9.1.0	9.2.0	
01/06/10	RAN_48	RP-100588	206	1	Resource sharing between scheduled and non-scheduled E-HICHs for LCR TDD	9.1.0	9.2.0	
01/06/10	RAN_48	RP-100587	208	1	Clarification for support of an E-HICH pair for 1.28Mcps TDD	9.1.0	9.2.0	
20/07/10	-	-	-	-	Correction of version references in change history table	9.2.0	9.2.1	
14/09/10	RAN_49	RP-100895	210	•	Correction of E-DCH Physical Uplink Channel for 1.28Mcps TDD	9.2.1	9.3.0	
07/12/10	RAN_50	RP-101317	211	2	Introduction of MC-HSUPA for 1.28Mcps TDD	9.3.0	10.0.0	
07/12/10	RAN_50	RP-101319	212	1	Introduction of MU-MIMO for 1.28Mcps TDD	9.3.0	10.0.0	
15/09/11	RAN_53	RP-111227	220	2	Clarifications on HSUPA for LCR TDD	10.0.0	10.1.0	

History

Document history						
V10.0.0	May 2011	Publication				
V10.1.0	October 2011	Publication				